

TAXONOMIC NOTES ON SHARKS AND RAYS.

By GILBERT P. WHITLEY.

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(Plates xx-xxii. and text-figs. 1-18.)

In preparing a popular handbook to the sharks and rays of Australia which, it is hoped, will soon be submitted to the Royal Zoological Society of New South Wales for printing, I have come across several noteworthy synonyms, new species, and other technical details which would better appear in another publication, and are accordingly assembled here.

Since "Notes on Some Australian Sharks" was published in the Memoirs of the Queensland Museum, Vol. x., 1934, pp. 180-200, I have collected further specimens in Queensland, on the Middleton and Elizabeth Reefs, and in Western Australia, and have examined specimens and literature in New Zealand, England, Europe, and the United States. My thanks are extended to all the many friends and colleagues who helped me, both in the field and in museums and libraries. I am indebted to Miss Joyce Allan and Miss Mary Soady for their artistic and accurate illustrations, and to Mr. G. C. Clutton for photographs.

References to literature, not repeated in these notes, will be found in McCulloch's Check-List of the Fishes recorded from Australia (Austr. Mus. Mem., v., 1929), or in the Memoirs of the Queensland Museum already quoted.

Family HETERODONTIDAE.

Genus HETERODONTUS Blainville, 1816.

Blainville's original description is not available in Australia, but I copied it out in London, as follows:—

"*Heterodontus*: Car. Dent. heteroclitis; Insp. nullis; P.S. 2 ut in praecedenti [i.e., in *Acanthorhinus*—G.P.W.]; P.A. magna; P.C. ferè ut in praeced. Spec. Philippi."

HETERODONTUS PORTUSJACKSONI (Meyer).

Add to synonymy: *Squalus philipp* Anon., Allgemeine Literatur-Zeitung, Band iii., No. 287, September 24, 1798; publication consulted in the British Museum, Bloomsbury, London.

Family HEMISCYLLIIDAE.

Genus PARASCYLLIUM Gill, 1862.

NEOPARASCYLLIUM, subg. nov.

Orthotype, *Parascyllum multimaculatum* Scott (Proc. Roy. Soc. Tas., 1934 (1935), p. 63, pl. v., fig. 1, from Tamar Heads, Tasmania).

First dorsal fin inserted behind the middle of the total length. Colour pale grey, tinged with brown, becoming almost white below. Ten rather diffuse rusty brown bars on sides; sides and back with numerous small dark brown spots.

CHILOSCYLLIUM (SYNCHISMUS) COLAX (Meuschen).

The species usually called *Chiloscyllium indicum* should be cited as above, since Meuschen named it *Squalus colax* in the Index to Gronow's Zoophylacium, Pisces, 1781, before Gmelin called it *Squalus indicus* in 1789.

Family ORECTOLOBIDAE.

SUTORECTUS, gen. nov.

Orthotype, *Crossorhinus tentaculatus* Peters, 1864, s. str. from South Australia.

Differs from true *Crossorhinus* = *Orectolobus* in having the nasal cirrhus simple instead of lobed or branched. Dorsal surface with rows of prominent tubercles or papillae. The interdorsal space is narrower than in most

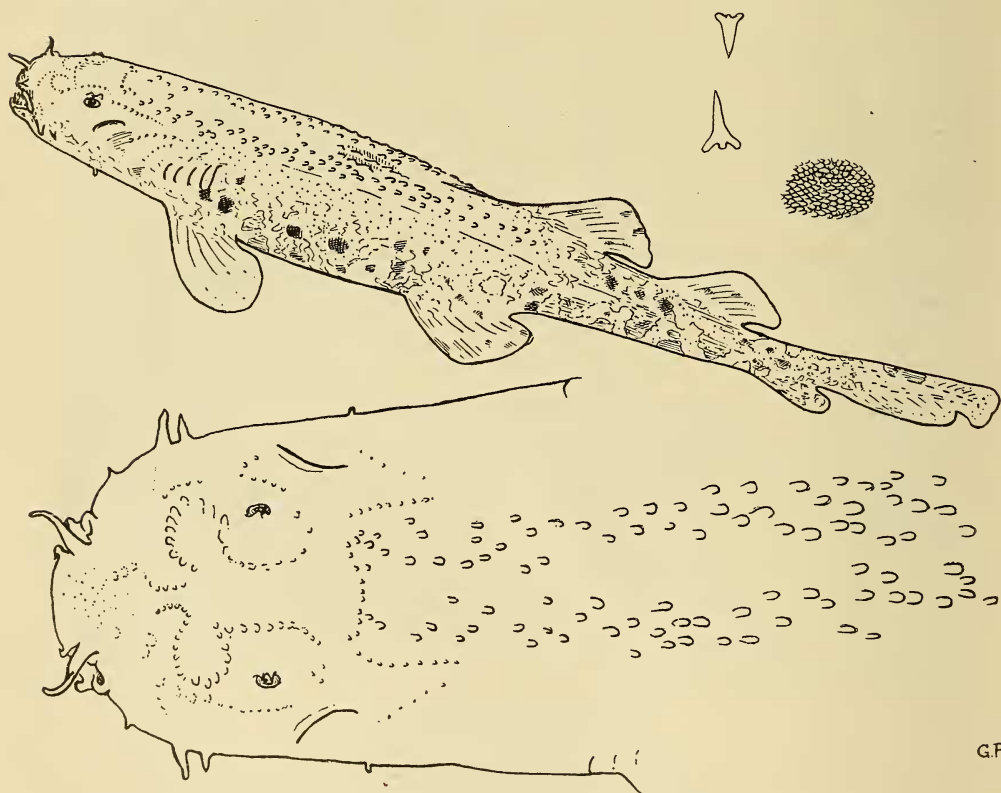


Fig. 1. *Sutorectus tentaculatus* (Peters). A specimen from Port Adelaide, South Australia (Austr. Mus., Regd. No. I. 2352). . . G. P. Whitley del.

species of *Orectolobus*. Spiracles larger than eyes. Length up to three feet. Littoral in South and Western Australia, where it is generally known as "Cobbler". A South Australian specimen of *Sutorectus tentaculatus* is here figured (fig. 1).

STEGOSTOMA TIGRINUM NAUCUM, *subsp. nov.*

(Fig. 2.)

The Zebra Shark (*Stegostoma*) has a very extensive distribution and apparently variable colour-patterns. The typical Indian form is strikingly banded; the Australian Museum has such a specimen from Madras. But other specimens have been figured (e.g., by Tanaka, Delsman and Hardenberg and others) with small spots instead of bands. A spotted example, similar to these, from the Hawkesbury River, New South Wales, is accordingly made the type of a new subspecies, *naucum*; Austr. Mus., Regd. No. I. 4,174. It has the anal and subcaudal lobes more separated than shown in

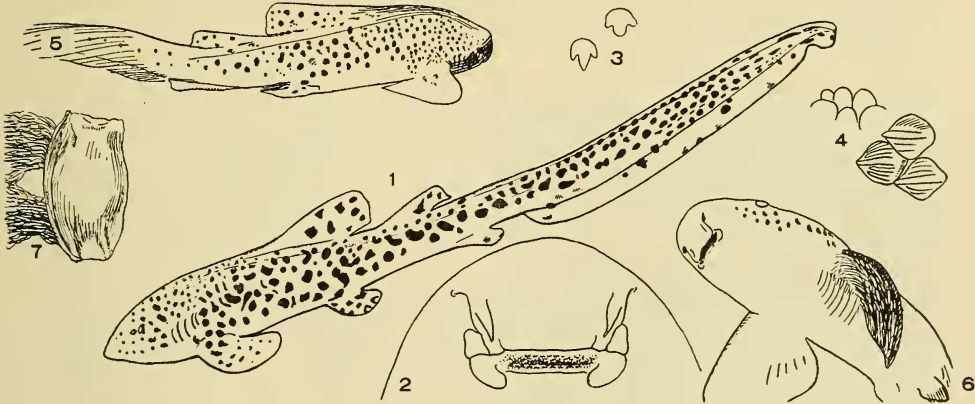


Fig. 2. *Stegostoma tigrinum naucum* Whitley. (1) Holotype of subspecies (Austr. Mus., Regd. No. I.4174) from Hawkesbury River, New South Wales; (2) mouth-parts, (3) teeth, (4) denticles of holotype; (5 & 6) attitudes of a living Sydney specimen, and (7) egg-case from Queensland with byssus. G. P. Whitley del.

figures of the spotted forms and differs in fin-proportions, in having larger spots, and thicker nasal cirrhi. Teeth tricuspid; dermal denticles variable from smooth to keeled, the central keel largest. All the eastern Australian specimens I have seen are referable to *naucum*, but a Wyndham (W. Australia) specimen in the Perth Museum is banded like the Indian *tigrinum*.

Family SCYLIORHINIDAE.

Genus SCYLIORHINUS Blainville, 1816.

The type of this genus is the European *canicula*, from which all the Australian species differ sufficiently to be regarded as distinct genera. Thus *Aulohalaelurus* Fowler, 1934, is available for *labiosus* Waite, *Asymbolus*, gen. nov. for *Scyllium anale* Ogilby, and *Juncrus*, gen. nov. for *Scyllium vincenti* Zietz. Distinguishing characters will be found in the keys of Regan (Ann. Mag. Nat. Hist. (8), i., 1908, p. 454) and McCulloch (Zool. Res. Endeavour, i., 1911, p. 6). The Australian ones also differ in the disposition of the pores and ampullae on the head from the European *Scyliorhinus*, whilst in male *Juncrus*, the ventrals are in contact behind the claspers.

FIGARO BOARDMANI (Whitley).

Many specimens referable to this species are in the "Endeavour" collections from the eastern edge of Bass Strait; 100-200 fathoms, trawled in 1912. Also from the Great Australian Bight, south and west from Eucla in depths of 70 to 450 fathoms, caught in April, 1913. Curiously, all are males, up to about 16 inches in length, and the humped back is characteristic of the largest specimens. This species, hitherto known only from Southern New South Wales, evidently lives in deep water around Victoria, Tasmania, South and South-western Australia, growing to a length of two feet. The colour-bands of the Bight specimens (subspecies *socius*, nov.) are fainter than those of the holotype.

ATELOMYCTERUS MACLEAYI, *sp. nov.*

(Fig. 3.)

Mr. Melbourne Ward recently collected several specimens of the cat-shark previously listed from Northern Australia as *Atelomycterus marmoratus* (Raffles). These came from Melville Island, Northern Territory, and included a female with well developed egg-capsule. They confirm the suspicion that I have expressed (Rec. Austr. Mus., xviii., 1932, p. 322, pl. xxxviii., fig. 1) that the Australian form is not typical *marmoratus*, so I name it as above with the Australian Museum specimen figured in 1932 as holotype. Not only does *macleayi* differ from figures of the Indian *maculatum* (Gray, Illustr. Ind. Zool., i., 3, July, 1830, pl. 98, fig. 1, not *Squalus maculatus* Bonnaterre; Day, Fish. India, etc.) in coloration and relative positions of fins, but the egg of the Melville Island female is $2\frac{3}{4}$ by 1 ins., is constricted before the posterior end, and only bears tendrils posteriorly; in these respects the egg differs from that ascribed to the China Sea *marmoratus* by Smedley (Journ. Malay Branch Roy. Asiatic Soc., v., 1927, p. 355).

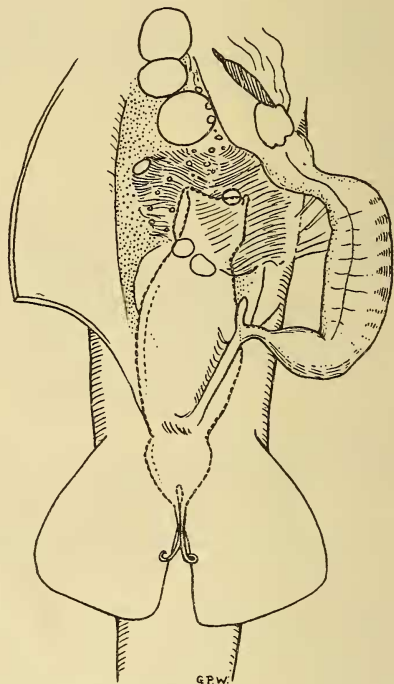


Fig. 3. *Atelomycterus macleayi* Whitley. Egg-case in utero. Melville Island, Northern Territory (Austr. Mus., Regd. No. IA. 7826). G. P. Whitley del.

Family GALEIDAE.

GALEOLAMNA GREYI, Owen.

The so-called Whaler Sharks have given me more trouble as regards their nomenclature and classification into species than any others. I have examined numerous specimens, yet would like to compare larger series to determine the limits of their variation. In their literature, every author

describing a species seems to use a different system of measurement or uses criteria disregarded by his colleagues, so that comparison of accounts is almost impossible. Sometimes only an odd jaw or some teeth are described or toothless embryos. Thus exhaustive study of the whalers, over some years, suggests that there may be one very variable species in Australia and New Zealand, or, as seems more likely, there is more than one species. The oldest name is *Galeolamna greyi* Owen, 1853, but the genus has been called *Carcharias*, *Carcharhinus* and *Eulamia* by Australian authors and my own genus *Galeolamnoides* falls as a synonym of *Galeolamna*. The latter name was proposed by Owen for a pair of jaws which I have examined in the Museum of the Royal College of Surgeons, England. The dental formula is 15.1.15 over 15.1.15; whilst the upper teeth are notched and serrated almost to their tips, the serrations on the lower jaw teeth are too minute to be seen by the naked eye, but can be felt. There are two small symphyseal teeth in each jaw, and the specimen is a South Australian Cocktail or Whaler Shark.

In the British Museum (Nat. Hist.), I examined Gunther's foetal specimens labelled "? *Squalus* (*Carcharias brachyurus*) J. B. Jukes, Esq." and "*Squalus* ? *brachyurus*, S. Australia". The snouts were buckled and the bodies rather twisted after their long preservation so that exact measurements could not be taken and, of course, they showed no dental characters. They were, however, Whaler Sharks, and the name *brachyurus* Gunther, 1870, is available for the New Zealand Whaler, if distinct from the Australian *greyi*.

The holotype of *Carcharias macrurus* Ramsay & Ogilby, 1887, from Port Jackson, is a small skin in the Australian Museum. It also is a Whaler. Waite's figure of *C. brachyurus* (Rec. Austr. Mus., vi., 1906, p. 226, pl. xxxix.) differs and appears to represent *stevensi* Ogilby; if so, this is a new record for New South Wales. Both *spenceri* and *stevensi* Ogilby, are "good" species, and the latter deserves subgeneric separation as *Ogilamia*, subg. nov. A Western Australian form has not yet been satisfactorily determined. Mr. D. G. Stead has recently published the best description of a Whaler Shark which has so far appeared, when describing the Bronze Whaler, *Galeolamna ahenea*.

LONGMANIA, *gen. nov.*

Orthotype, *Carcharias* (*Aprion*) *brevipinna* Muller & Henle.

Differs from typical *Aprionodon* (genotype, *Carcharias* (*Aprion*) *isodon* M. & H. from America) in having an elongate, tapering snout; second dorsal smaller than anal, with its origin a little behind that of anal; and origin of first dorsal fin above inner angle of pectoral fin.

Named after Mr. Heber A. Longman, Director of the Queensland Museum, Brisbane, who has generously placed at my disposal many specimens of elasmobranchs and fishes in the last fifteen years.

LONGMANIA BREVIPINNA (Muller & Henle).

(Fig. 4.)

Carcharias (*Aprion*) *brevipinna* Müller & Henle, Syst. beschr. Plagiost. (2), 1839, p. 31, pl. ix., Java., *Aprionodon brevipinna* of modern authors.

Nictitating membrane present. Nostrils small, narrow. No spiracle. Snout elongate, acute. Rictus twice as broad as long. Teeth in upper jaw nearly erect, not serrated on base or cusp. In the lower jaw, the teeth are smaller, narrower, erect, entire, acute and with broad bases.

There appear to be no diminutive teeth at symphyses. Gill-slits wide, the last over pectoral. General form and proportions as in accompanying figure. Body with close-set denticles, each with about five carinae. Second dorsal fin smaller than anal and originating behind level of anal origin. Caudal pits present.

Greyish-blue above and on the fins. White below. A diffuse band of greyish-blue near middle of side of body as in some whaler sharks. Upper caudal pit smoky grey. Eye bluish.

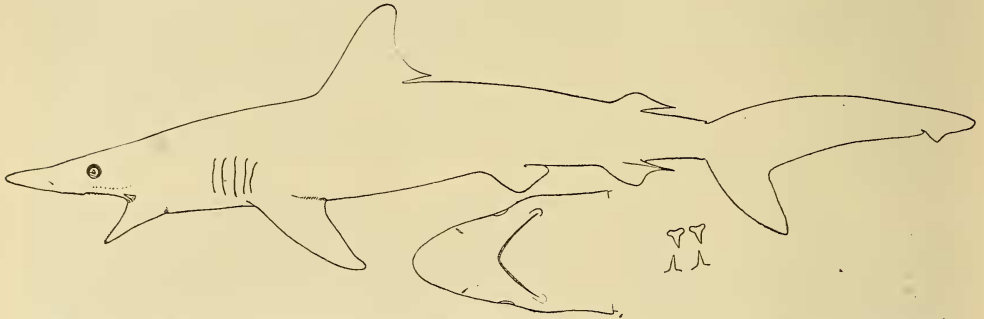


Fig. 4. *Longmania brevipinna* (Müller & Henle). An immature male from Cape Cleveland, Queensland (Qld. Mus., Regd. No. I. 6714). G. P. Whitley del.

Described and figured from an immature male, 780 mm. or about 31½ inches long, from Cape Cleveland, Queensland. Qld. Mus., Regd. No. I. 6714; presented by Mr. George Coates. Hitherto only recorded from the East Indies (Java) and Japan, this species may now be added to the Australian fauna.

Genus NEGOGALEUS Whitley, 1931.

Negogaleus Whitley, Austr. Zoologist, vi., February 13, 1931, p. 334. Orthotype, *Hemigaleus microstoma* Bleeker. New name for *Hemigaleus* Bleeker, 1852, regarded as preocc. by *Hemigalea* Blainville, 1837, and *Hemigalus* Jourdain, 1837, in Mammalia.

NEGOGALEUS MICROSTOMA (Bleeker).

(Fig. 5.)

Hemigaleus microstoma Bleeker, Verh. Bat. Gen., xxiv., 1852, Plagiost., p. 46, pl. ii., fig. 9. Batavia. *Id.* of later authors.



Fig. 5. *Negogaleus microstoma* (Bleeker). Male from Salamander Rocks, Queensland (Qld. Mus., Regd. No. I.6667). G. P. Whitley del.

Eye with nictitating membrane. A tiny slit-like spiracle. Mouth crescentic, with labial folds. Teeth of the upper jaw oblique, strongly serrated on their outer margins; the lower jaw teeth much smaller, erect, narrow, on broad bases, not serrated. Teeth at symphyses smaller than lateral ones. Body elongate. Denticles rough, each with several carinae. The large anal fin originates behind the level of the second dorsal origin. A long caudal peduncle with pit above and below. Silver above, with grey, pink, or bluish reflections from the rough shagreen; white below. No black or white marks on fins.

A male specimen, $28\frac{1}{2}$ inches long, was identified as this species by Mr. T. C. Marshall, of the Queensland Museum, and sent to me for purposes of illustration and record. Whilst known from several localities in the East Indies, this is the first notice of *Negogaleus* from Australia, and the species seems never to have been figured full-length before. Ours differs a little in proportions and colour from Bleeker's description, but not enough to justify specific separation.

Locality.—Salamander Rocks, North Queensland; Mr. George Coates. Queensland Mus., Regd. No. I. 6,667.

New record for Australia.

APRIONODON ACUTIDENS QUEENSLANDICUS, *subsp. nov.*

(Fig. 6.)

No spiracles. Nictitating membrane present. Upper labial fold short, lower labial fold minute. Teeth long, erect, acute, entire, with broad smooth bases. Small teeth at symphyses. Denticles mostly tricarinate. Dorsal

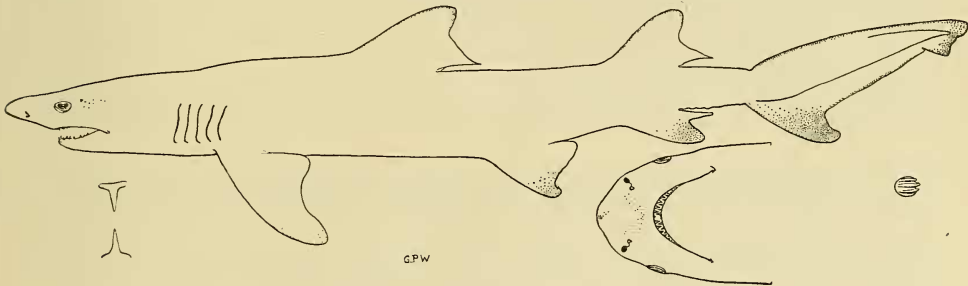


Fig. 6. *Aprionodon acutidens queenslandicus* Whitley. Female holotype of subspecies from Townsville, Queensland (Qld. Mus., Regd. No. I.6189). G. P. Whitley del.

origin behind level of inner pectoral angle. Second dorsal larger than anal with its origin in advance of anal origin. Caudal pits above and below. Some lumps above and below caudal peduncle, on anal and caudal fins, and elsewhere perhaps due to disease or parasites.

General characters as in *Carcharias acutidens* Rüppell (Neue Wirbelth. Abyssin. Fische, ii., 1837, p. 65, pl. xviii., fig. 3, from Djetta, Red Sea) but snout is more acute, ventral fins are comparatively larger, and the inferior margin of the upper lobe of caudal fin is more produced.

Described and figured from the holotype of the subspecies, a female 645 mm. or nearly 26 inches long.

Locality.—Townsville, North Queensland; Mr. George Coates. Queensland Mus., Regd. No. I. 6,189.

A slightly larger male paratype, with very dark tips to fins, is in the Queensland Museum (No. I. 5975) from the same place, also two small females: one (I. 6117) from Cape Cleveland (G. Coates) and the other (I. 5577) collected by Mr. H. A. Longman in Moreton Bay.

Apparently this shark is not uncommon along the Queensland mainland coastline.

PLATYPODON COATESI, *sp. nov.*

(Fig. 7.)

Head with conspicuous pores, blunter snout and larger nostrils than in the genotype of *Platypodon* (i.e., *Carcharias menisorrhah* Muller & Henle, Syst. beschr. Plagiost., ii., 1839, p. 46, pl. xvii., from Java, New Holland and the Red Sea). Rictus rather angular, broader than long. Erect, compressed teeth in upper jaw, each with one large central cusp (not serrated

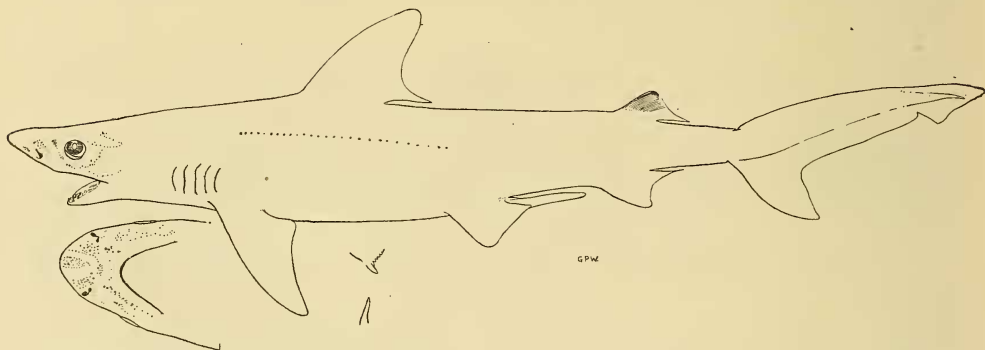


Fig. 7. *Platypodon coatesi* Whitley. Male holotype from Hinchinbrook Passage, Queensland (Qld. Mus., Regd. No. I.6226). G. P. Whitley del.

to tip and sometimes not serrated at all), notched, with six or seven strong serrations on one side of the base and on the other a less strongly serrated convex edge. Lower jaw teeth curved, flexuous, acute, sloping outwards, entirely without serrae. No spiracle. Eye large, with nictitating membrane. Nostrils large, with broad flaps. Third gill-slit widest. General form and proportions as in the accompanying figure. Denticles of body very small with four or five carinae instead of three as in *menisorrhah*. Dorsal fin over pectoral-ventral interspace, nearer pectoral. Second dorsal subequal to anal, its origin further back than anal origin. A crescentic caudal pit above and below.

Colour satiny grey above with a violaceous tinge on fins. A large dark brown blotch on anterior half of second dorsal fin.

Described and figured from the holotype of the species, a male, 31 inches long; Queensland Mus., Regd. No. I. 6,226.

Locality.—Hinchinbrook Passage, Queensland; Mr. George Coates.

This shark seems near *Platypodon menisorrhah*, but differs in tooth and denticle characters. Possibly Muller & Henle's type came from the Red Sea

and Eastern Australian records of *menisorrah* are referable to this new species, which I name in honour of Mr. George Coates, who has collected many interesting elasmobranchs and large fishes in North Queensland.

SCOLIODON JORDANI, Ogilby.

(Fig. 8.)

The accompanying figure shows a 33 inch female from Lindeman Island, Queensland, caught on 13th August, 1935, with the embryo curled in the

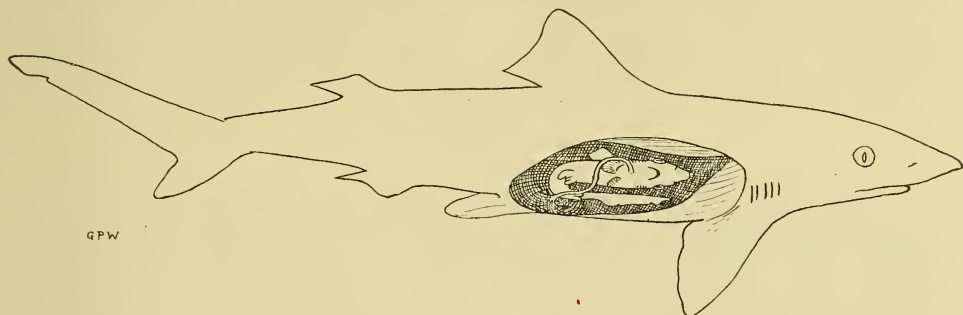


Fig. 8. *Scoliodon jordani* Ogilby. Female and embryo from Lindeman Island, Queensland G. P. Whitley del.

uterus (shaded); a second embryo was unfortunately destroyed by fishermen. The figured foetus is preserved in the Australian Museum (Regd. No. IA. 6681) together with the head of the mother (IA. 6569). The embryo was $4\frac{1}{2}$ inches curled, but $8\frac{1}{2}$ inches when straightened out. The umbilical cord, $6\frac{1}{2}$ ins. long, was firmly attached to the uterine walls and villi by a boot-shaped or bi-lobed "placenta". There were no external gills.

I saw a second specimen of this species at Lindeman Island on 26th August, 1939. The female here figured shows some slight variation in proportions from the males I illustrated in Mem. Qld. Mus., x., 1934, p. 186, figs. 2 and 3, but these differences may be due to sex or variation.

RHIZOPRIONODON CRENIDENS (Klunzinger).

Through the kindness of Dr. M. Rauther, I was enabled to see the female holotype of *Scoliodon crenidens* Klunzinger from Queensland in the Württembergische Naturaliensammlung, Stuttgart (No. 2,449), also a second smaller specimen received from Baron von Müller in 1891. The head is somewhat distorted and the teeth are not as noticeably serrated as Klunzinger's figure shows, and it is possible that *Scoliodon jordani* (forma *longmani*) may be a synonym, except that I have never seen a specimen of *jordani* with serrated teeth. Approximate measurements of the holotype of *crenidens* in millimetres are: Head, 120; interorbital, 40; snout to first dorsal, 170; base of first dorsal, 50; interdorsal space, 150 (shrunk); upper caudal lobe, 155; snout to mouth, at least, 48; snout to pectoral, c. 120? Pectoral nearly 70; pectoral to ventral, 150. Dorsal origin nearer pectorals than ventrals. Anal larger than second dorsal. Pectoral reaching to level of two-thirds dorsal base.

Genus *TRIAENODON* Muller & Henle, 1837.

Triaenodon Müller & Henle, Ber. Verh. k. pr. Akad. Wiss. Berlin, ii., 1837, p. 113 and Mag. Nat. Hist. (ed. Charlesworth), n.s., ii., 1838, p. 36 (genus caelebs); Syst. Plagiost., 1839, p. 55. Genotype, *Carcharias obesus* Rüppell.

This genus is characterised by having tricuspid teeth, a large second dorsal fin, and white-tipped dorsal and caudal lobes. It is now recorded from Australia for the first time, having been known before from the Red Sea, Indian Ocean, East Indies, and South Sea islands from the New Hebrides to Hawaii, Tahiti, and Cocos Island. Specimens up to ten feet long have been mentioned but the Australian species, regarded as new, is only about 2½ feet long, as far as is known.

TRIAENODON APICALIS, sp. nov.

(Fig. 9.)

Head one-fifth of total length; it is much depressed and longer than wide. Snout broadly rounded. Eye rather small, ovate, free from orbital margin and with well developed nictitating membrane and small pupil. Nostrils large, less than eye-diameter, oblique, gaping, nearer eye than tip of snout, with broad round anterior flaps and minute posterior ones. Mouth inferior, parabolic, much wider than long. Rictus grooved but labial folds obsolescent. Numerous backwardly-directed teeth each with three entire

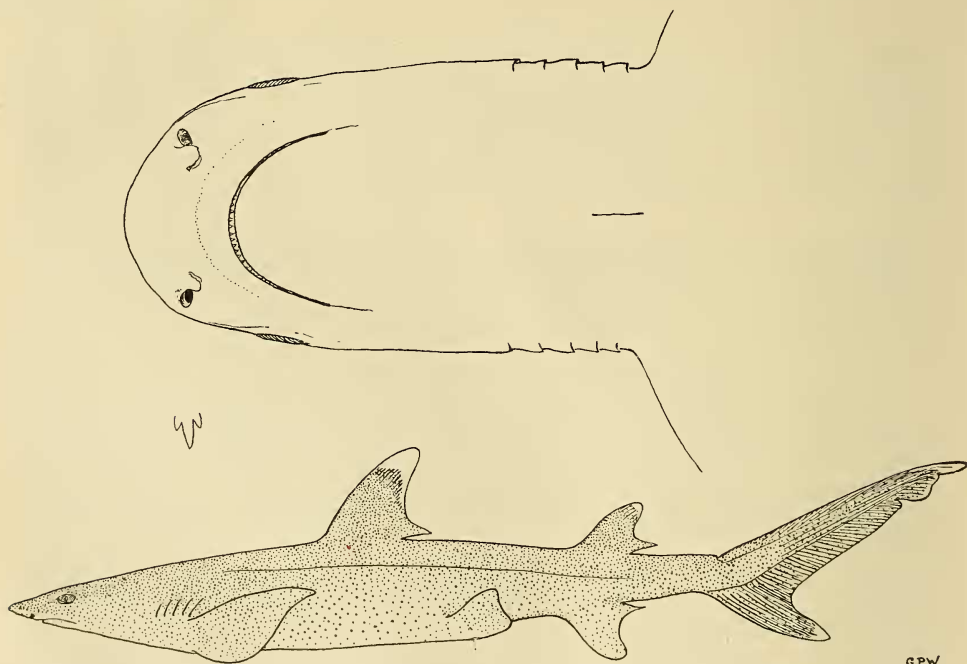


Fig. 9. *Triaenodon apicalis* Whitley. Female holotype from Lindeman Island, Queensland (Austr. Mus., Regd. No. IA.6566). G. P. Whitley del.

acute cusps, the central one longest; they are similar in both jaws, of moderate size, small at symphyses. No spiracles. Auditory openings conspicuous on vertex. Five gill-slits, all longer than eye, increasing in size posteriorly, last one over pectoral base and sloping obliquely backwards.

The following measurements are approximate, since the specimen is curled. Total length, 700 mm. Head, 140. Snout to first dorsal origin, 225; to second, 420; to caudal root, 510. Depth, 72. Upper caudal lobe, 184. Vent to tip of snout, 340; to tip of tail, 370. Eye, 15. Interorbital, 69. Width of head, 78; its height, 43. Snout, 31. Eye to first gill-opening, 57. Internarial, 27, equals preoral length, 27. First dorsal base, 48; its oblique height, 97. Second dorsal base, 41; height, 56. Interdorsal space, 123. Second dorsal to caudal pit, 60. Anal to caudal pit, 54. Pectoral fin, 97.

Body elongate, about as broad as high anteriorly, but higher than broad further back. Belly rounded. Back with slight median depression. Caudal peduncle ovate in cross-section. A pronounced caudal pit above and an indistinct one below. Integument of coarse shagreen of more or less imbricate rhomboid denticles varying considerably from smooth to scalloped or tri-carinated on different parts of the animal. Lateral line inconspicuous except along middle of sides. Umbilical scar still present. Vent a little nearer tip of snout than end of tail.

First dorsal fin larger than second, its base over the pectoral-ventral interspace. Second dorsal well developed, its base very slightly before that of anal fin anteriorly. Pectorals moderate, just reaching level of first dorsal origin, and subequal in length to height of first dorsal fin. Ventrals small. Caudal fin tapering, the lobed tip overhanging a triangular lobe; lower caudal lobe about half the length of the upper. Abdominal pores papilliform.

Colour greyish to brownish grey, tinged pinkish on parts of head and body; the darkest grey is on the back and the belly is a whitish-grey. Eye blue. All dorsal and caudal lobes with conspicuous milky-white tips; anterior edges of fins dusky. Some irregular dusky blotches on and near ventral fins.

Described from the holotype, an apparently immature female specimen, 28 ins. or 700 mm. long, preserved in formalin. Austr. Mus. Regd. No. IA. 6,566.

Locality.—Lindeman Island, North Queensland; September, 1935. Melbourne Ward and G. P. Whitley coll.

A paratype is similar, with same data, and the Museum has another specimen from the Sir Edward Pellew Islands, Gulf of Carpentaria, Northern Territory.

This new species is allied to *Carcharias obesus* Rüppell (Neue Wirbelt. Abyssin., Fische, ii., 1837, p. 64, pl. xviii., fig. 2) from the Red Sea, but differs in the shape of the snout and mouth and in having the first dorsal fin nearer the pectorals. *Triaenodon obtusus* Day (Fish. India, 1878, p. 720, pl. clxxxix., fig. 3), from Kurrachee, has blunter snout, wider mouth, and differently shaped caudal fin. A Hawaiian ally has been figured by Fowler (Mem. Bish. Mus., x., 1928, p. 22, fig. 7).

This shark is probably viviparous and harmless to man.

Genus *MUSTELUS* Linck, 1790.

From Hubbs' recent discussion on the taxonomy of this genus, it might appear that the earliest name for it is *Galaeus* Müller (Deliciae Naturae

Selectae (Knorr), ii., 1767, p. 55—*fide* Hubbs, Occas. Pap. Mus. Zool. Univ. Mich., 374, 1938, p. 7), but Iredale (Proc. Malac. Soc. London, xv., 1922, p. 78) after a study of the Deliciae, found that the names in it were non-Linnean, so *Galeus* has no standing, and *Mustelus* may be employed as usual, unless regarded as preoccupied by *Mustela* Linné, 1758, the Weasel. *Galeus* Rafinesque, 1810, is based on *G. melastomus* Raf., which is therefore the genotype, not *Squalus galeus* Linné. Also *Galeorhinus* Blainville, 1816, does not concern *Mustelus*, because its type was designated as *galeus* by Gill in Ann. Lyc. Nat. Hist. N. York, vii., 1862, p. 402, though, much earlier, Bosc had said of it (Nouv. Dict. Hist. Nat., nouv. ed., xii., July, 1817, p. 377), "Les Squales milandre [= *galeus*] et Emissole [= *mustelus*] lui servent de type". Thus with *Galeus* and *Galeorhinus* eliminated, the first synonym of *Mustelus* is *Mustellus* Fischer-Waldheim (Zoognosia, ed. 3, i., 1813, p. 78), with *Squalus mustelus* as logotype. *Mustellus* should not be confused with *Mustella* Bosc., 1818, preocc. in mammals by Scopoli, 1777, and *Mustela* Cloquet, 1824, preocc. in mammals by Linné, 1758; the latter names refer to rocklings of the family Gadidae. *Mastelus* Partington (Brit. Cyclop. Nat. Hist., iii., 1837, p. 650) and *Mustelas* Lankaster (Engl. Cyclop. (Knight), iv., 1856, p. 886, ex Penny Cyclop.) are however variants of *Mustelus*, the shark. Because of these various spellings, genders, and employment of similar names for sharks, weasels, and rocklings, it seems reasonable to regard *Mustelus* Linck as preoccupied by *Mustela* Linné, and use the next valid name, *Emissola* Jarocki, 1822. Hubbs appears to have overlooked the name *Myrmillo* Gistel (Naturg. Thierr. höh. Schulen, 1848, p. x.), proposed for the shark, *Mustelus* Cuv., regarded as preocc. by *Mustela* Linné; the only species mentioned by Gistel is *M. vulgaris*, that is *M. mustelus* (Linn.). The name *Pleuracromylon* Gill, 1864, is a synonym of *Mustelus* Linck, but *Cynias* Gill, 1903, still remains as the first valid name for the Spotted Dogfish identified by Hubbs as *Mustelus asterias* Cloquet.

EMISSOLA MAUGEANA, *sp. nov.*

(Fig. 10.)

Size large for the genus. Form elongate. Tail shorter than head plus body; the body robust. A median carina along back from level of pectorals, between the dorsals, to tail. Head depressed, snout acutely rounded. Eyes large, placed midway between tip of snout and first gill-opening, and with well developed nictitating membranes. Spiracles small oblique slits. Nostrils large, nearer mouth than tip of snout. Mouth opening in advance of eye level, its angle of occlusion more than 90°. Outer labial folds reaching further forward than inner ones. Teeth paved, in broad scrolls with several functional series, each with a slightly raised blunt crown but no cusps so that the functional profile is a blunted obtuse angle. Third gill-slit longest.

Denticles of side of body (from a point equal to horizontal diameter of orbit below origin of first dorsal) with two or three (sometimes four) ridges, these generally reaching almost to posterior edge. Denticles on belly smaller, and without carinae. The unique holotype is curled so that the following measurements are approximate.

Total length, 915 mm.

Tip of snout to anterior margin of orbit, 72.

Tip of snout to front of mouth, 57.5.

Tip of snout to outer angle of nostril, 42.

Tip of snout to first gill-opening, 162.

Tip of snout to fifth gill-opening, 195.
 Horizontal diameter of orbit, 26.
 Vertical diameter of orbit, 14.
 Interorbital, 70.
 Width of head, 104.
 Width of mouth (angle to angle), 54.
 Internarial, 27.
 Depth of body, about 98 mm.
 Snout to first dorsal origin, circa 270.
 Interdorsal, circa 210.
 First dorsal fin: anterior margin, 107; posterior margin, 44; base, 89.
 Second dorsal fin: anterior margin, 80; posterior margin, 0; base, 75.
 Second dorsal fin to beginning of caudal, 100.
 Anal fin: anterior margin, 62; posterior margin, 21; base, 53.
 Pectoral fin: outer margin, 144; inner margin, 75; base, 45.
 Upper caudal lobe, 180.
 Lower caudal lobe, 74.
 Tip of caudal to notch, 85.

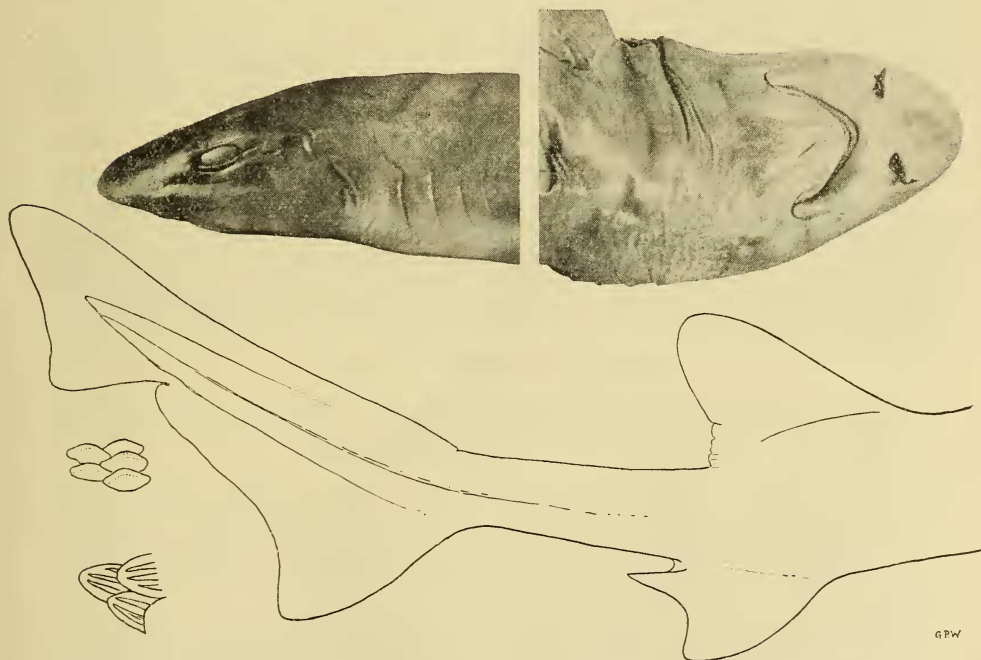


Fig. 10. *Emissola maugeana* Whitley. Holotype from off Flinders Island, Tasmania (Austr. Mus., Regd. No. IA.1922). G. C. Clutton photo and G. P. Whitley del.

Origin of first dorsal fin well behind level of base of pectorals. Posterior margin of second dorsal fin fused with back (doubtless abnormal). Anal

fin smaller than dorsals. Lower caudal lobe fairly well developed, rounded.

Colour (in formalin), uniform dark grey above, lighter below. No white spots. A dark blackish band with ragged edges along middle of each side below lateral line.

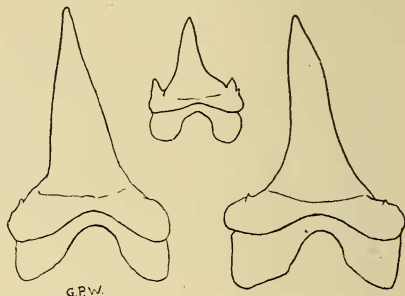
Described and figured from the unique holotype of the species, a female, 915 mm. or three feet long, from off Flinders Island, Tasmania; collected by the late W. E. J. Paradise in 1923 or 1924. Australian Museum, Regd. No. IA. 1,922.

Family LAMNIDAE.

LAMNA WHITLEYI, Phillipps.

(Fig. 11.)

Lamna whitleyi Phillipps, New Zeal. Journ. Sci. Tech., xvi., 4, January, 1935, p. 239, fig. 3. Wellington and Nelson, New Zealand.



The accompanying figure represents the teeth from the type-specimen in the Dominion Museum, Wellington.

Fig. 11. *Lamna whitleyi* Phillipps. Teeth from holotype, New Zealand. G. P. Whitley del.

SQUALICORAX, *gen. nov.*

Orthotype, *Galeus pristodontus* Agassiz, 1835.

A new name is necessary for the shark called *Corax*, because Mr. T. Iredale informs me that Agassiz' name is preoccupied by *Corax* Ledru (Voy. Ténériffe, ii., 1810, p. 204), a generic name for the Raven. The orthotype of my new genus is *Galeus pristodontus* Agassiz (Poiss. Foss., Feuilleton, 54, 1835) = *Corax pristodontus* Agassiz (Poiss. Foss., iii., 1843, p. 224) = *Squalicorax pristodontus*.

CARCHARODON ALBIMORS, *sp. nov.*

? *Squalus carcharias* Labillardiere, Voy. rech. La Perouse, i., 1800, pp. 276 & 399 (New Guinea and S.W. Australian coast). Not *Squalus carcharias* Linné, Syst. Nat., ed. 10, 1758, p. 235, from Europe.

Carcharias leucas Bennett, Proc. Zool. Soc. Lond., xxvii., 1859, p. 223 (Port Jackson. Specimen in Austr. Mus.). *Id.* Jouan, Mem. Soc. Imp. Sci. Nat. Cherbourg, xiv., 1869, p. 85 (Auckland, N.Z.). Not *Carcharias* (*Prionodon*) *leucas* Müller & Henle, Syst. Plagiost. (2), 1839, p. 42, ex Valenciennes, MS., from the Antilles.

Carcharodon rondeletii Müller & Henle, Syst. Plagiost. (2), 1839, p. 70 ("Neuholland" record only; not type from Mediterranean and Atlantic). *Id.* Gunther, Cat. Fish. Brit. Mus., viii., 1870, p. 392. *Id.* Hutton, Colon. Mus. & Geol. Surv. Dept. Publ., xviii. (Cat. Fish., N.Z.), 1872, p. 78. *Id.* Klunzinger, Sitzb. Akad. Wiss. Wien., lxxx., 1, 1879, p. 426. *Id.* Gunther, Stud. Fish., 1880, p. 320, fig. 114. *Id.* Macleay, Proc. Linn. Soc. N.S.W., iv., 1880, p. 459; Cat. Austr. Fish., ii., 1882, p. 294. *Id.* Ramsay, Proc. Linn. Soc. N.S.W., v., 1880, p. 96. *Id.* Tenison-Woods, Fish. Fisher. N.S.W.,

1882, p. 25. *Id.* McCoy, Prodr. Zool. Vict., viii., 1883, p. 19, pl. lxxiv. *Id.* Haswell, Proc. Linn. Soc. N.S.W., ix., 1884, p. 83, pl. i., figs. 1-4 (skeleton). *Id.* Ogilby, Cat. Fish. N.S.W., 1886, p. 2. *Id.* Parker, Proc. Zool. Soc. Lond., 1887, p. 27, pls. iv.-viii. (anatomy). *Id.* Ogilby, Proc. Linn. Soc. N.S.W. (2), iii., 1889, p. 177. *Id.* Lucas, Proc. Roy. Soc. Vict. (2), ii., 1890, p. 43.

Carcharias maso [sic] Morris, Austral English, 1898, p. 412. New Zealand. Not *Squalus* (*Carcharias*) *maou* Lesson, Voy. Coquille, Zool., ii., 1, 1831, p. 91, pl. i., from the Paumotu Islands.

Carcharodon carcharias Waite, Mem. N.S.W. Nat. Club, ii., 1904, p. 8, and Rec. Canterb. Mus., i., 1907, p. 6. *Id.* Stead, Fish. Austr., 1906, p. 233. *Id.* Zietz, Trans. Roy. Soc. S. Austr., xxxii., 1908, p. 291. *Id.* Stead, Lone Hand, Dec., 1913, p. 35. *Id.* Ogilby, Mem. Qld. Mus., v., 1916, p. 74. *Id.* Smith, Amer. Mus. Journ., xvi., 1916, p. 342, figs. *Id.* McCulloch, Austr. Zool., i., 7, 1919, p. 223; Austr. Zool. Handb., i., 1922, p. 8 (not figs.). *Id.* Waite, Rec. S. Austr. Mus., ii., 1921, p. 21; Fish. S. Austr., 1923, p. 40 (not fig.). *Id.* Phillipps, N.Z. Journ. Sci. Tech., vi., 1924, p. 269, fig. 14. *Id.* McCulloch & Whitley, Mem. Qld. Mus., viii., 1925, p. 129. *Id.* Whitley, Austr. Mus. Mag., iii., 1926, p. 13. *Id.* Roughley, Austr. Mus. Mag., iii., 1927, p. 152. *Id.* Phillipps, Mar. Dept. Fish. Bull., i., 1927, p. 9. *Id.* McCulloch, Austr. Mus. Mem., v., 1929, p. 15. *Id.* Coppleson, Med. Journ. Austr., 1933, p. 458, figs. ii. (3), and vi. (b). *Id.* Stead, N.S.W. Rod Fishers' Gazette, Dec., 1935, p. 9, and of angling and sporting papers since. *Id.* Tubb, Proc. Roy. Soc. Vict., xlix., 1937, p. 422. *Id.* Grey, Amer. Angler in Austr., 1937, p. 48, pls. 34-35. *Id.* Young & Mazet, Shark! Shark! *Id.* Chapman, Open Air Stud. Austr., 1929, p. 70, pl. opp. p. 68.

Carcharhinus carcharias Whitley, Mem. Qld. Mus., x., 1934, p. 199.

The above is the bibliography of the Australian and New Zealand White Death or White Pointer Shark, known as Mango-tuatini or Hare Hongi in Maori. Very large specimens have been caught off South Australia and Victoria, whence McCoy figured a specimen and noted differences in the form and position of the fins in comparison with the European *carcharias*. A large New South Wales specimen is in the Australian Museum, as noted by Bennett, and may be regarded as type of *albimors*.

Family HALSYDRIDAE.

HALSYDRUS MAXIMUS (Linné).

This species has received many different names, as follows:—

Squalus maximus Linné, 1758; *Halsydrus pontoppidiani* Fleming, 1809; *Tetroras angiova* Rafinesque, 1810; *Squalus gunnerianus* Blainville, 1810; *Squalus homianus* Blainville, 1810; *Squalus peregrinus* Blainville, 1810; *Cetorhinus gunneri* Blainville, 1816; *C. shavianus* Blainville, 1816; *Scoliophis atlanticus* Anon., 1817; *Squalus rostratus* Macri, 1819; *S. isodus* Macri, 1819; *S. elephas* Le Sueur, 1822; *Selache maxima* Cloquet, 1825 et auct.; *Selachus rhinoceros* Dekay, 1842 (ex Mitchill, newspaper name, 1828); *Cetorhinus maximus* Gray, 1851, et auct. recen.; *Squalus cetaceus* Gray, 1854; *Polyprosopus rashleighanus* Couch, 1862; *P. macer* Couch, 1862; *Cetorhinus blainvillei* Capello, 1869; *Hannovera aurata* Van Beneden, 1871; *Selache pennanti* Noetling, 1885; *S. glauconitica* Noetling, 1885; *Tetroras maccoyi* Barrett, 1933 (the Australasian form).

Family SQUALIDAE.

LEIUS FEROX, Kner.

A specimen found dead, floating off Sydney Heads, April 25, 1939, and presented to the Australian Museum by Mr. D. G. Stead, constitutes a new record for New South Wales. Its length was $16\frac{1}{2}$ inches, but this Museum has others up to 18 inches long from Lord Howe Island. The liver was large and yielded a very clear limpid oil. This species is probably luminous in life. The dorsal fins are small, without spines, the first very slightly in advance of the ventrals. Colour greyish brown, lighter below except for a collar-like greyish brown band across the throat below gill-slits. Mouth and tips of fins white. I saw a specimen of this species caught by the "Dana" in the Tasman Sea on February 23, 1929.

SOMNIOSUS ANTARCTICUS, *sp. nov.*

Somniosus sp. Waite, Australas. Antarct. Exped., 1911-14, Sci. Rept. (C), iii., 1, 1916, p. 51, fig. 10.

There appear to be no sharks whatever recorded from the Antarctic Continent, but a curious shark was found cast up on the beach of Macquarie Island in 1912. A sketch of it was made by a Mr. Hamilton and was reported upon by Waite. It was 8 ft. 2 ins. long and had a stout body; two dorsal fins, apparently without spines, and in normal position; no anal fin; eye small; snout short; mouth inferior; five small gill-openings; caudal fin short. There were 44 raptorial teeth in the upper jaw and 56 sectorial ones in the lower; no median tooth. Scales small, non-imbricate, slightly hooked tubercles.

Genus SQUALUS Linné, 1758.

The species of this genus from Australia and New Zealand are referable to two well-defined groups, each worthy of a new subgeneric name:—

- A. Eye about 4 in head, subequal to snout. Origin of first dorsal fin nearer snout than origin of second, above or a little behind level of base of pectoral. Body uniformly coloured. *Flakeus*, nov.
- AA. Eye 6 or more in head, much shorter than snout. Origin of first dorsal fin nearer that of second than to snout, well behind level of pectoral base. Body with large white spots. *Koinga*, nov.

The genotype of *Flakeus* is *Squalus megalops* Macleay and the subgenus also includes *tasmaniensis* and *griffini*. The genotype of *Koinga* is *Squalus whitleyi* Phillipps, with its New Zealand ally, *kirki*. There are further features of the teeth, dermal denticles, position of nostrils, etc., which distinguish the above subgenera from true *Squalus*.

CENTROPHORUS SCALPRATUS, McCulloch.

(Fig. 12.)

Eye (30 mm.) 4.4, snout (42) 3.1, interorbital (59) 2.2 in the head (132). Head 4.1, depth (78) nearly 7 in total length (544). Width of head before gills greater than preoral length. Snout acute. Nostrils large, transverse. Spiracles large, crescentic, less than half the large eye. No nictitating fold or membrane. Mouth little arched with deep labial grooves. Teeth acute, erect, unicuspid in upper jaw, rather like arrowheads, in several series. Teeth deflected obliquely outwards in lower jaw and with microscopical serrae. No median tooth in lower jaw. Five moderate gill-openings,

the last, which lies over pectoral base, is much deeper than the first. Chin folds present.

Body rounded, robust, covered with spaced rough tricarinate denticles which are not arranged in rows. On the snout the denticles are enlarged, with five or more converging carinae. Anal area and axils naked. Belly not flattened. No lateral keels.

Each dorsal fin preceded by a compressed spine with grooves. First dorsal spine shorter than second, but first dorsal fin larger than second. Posterior angle of pectorals notably produced. Ventrals in advance of origin of second dorsal; they are attached to the body just behind the vent on each side and their origins are nearer caudal than pectorals. Upper caudal lobe well developed, truncate; lower lobe rounded. No anal fin. No conspicuous black glandular areas. Lateral line system not very conspicuous.

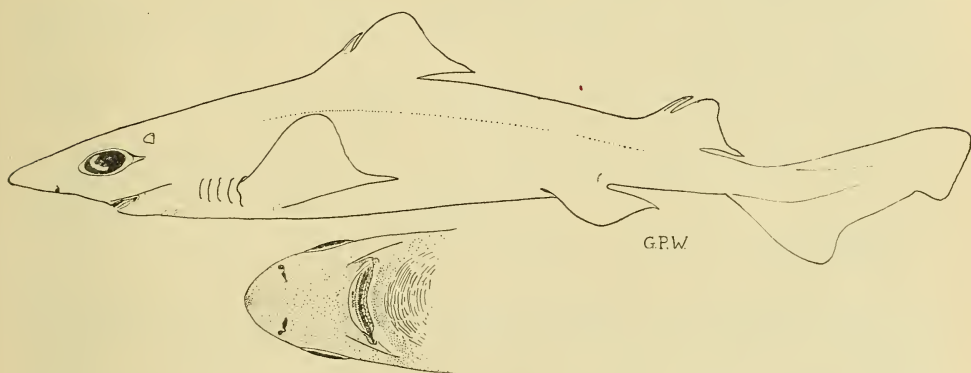


Fig. 12. *Centrophorus scalpratus* McCulloch. A female from off Gabo Island, Victoria (Austr. Mus., Regd. No. E.5533). . G. P. Whitley del.

General colour dark brownish grey, becoming yellower or with a vinous tinge on fins. Fin-spines blackish. Axillary areas, chin and labial folds, lips, and edges of nostrils and gills whitish. Eye greyish.

Described and figured from a female specimen (No. E. 5,533), one of a series trawled in 240 fathoms, 30 miles S.W. of Gabo Island, Victoria, by the "Endeavour" on 12th September, 1914. Another was taken in 70 fathoms, east of Babel Island, Bass Strait.

Differ from the type of *scalpratus* figured by McCulloch (Biol. Res. Endeavour, iii., 1915, p. 97, pl. xiii., figs. 2-7) from the Victorian coastline in having teeth of upper jaw erect, dermal denticles more carinate, second dorsal fin overhanging subcaudal lobe, and caudal fin about a quarter total length. These differences may be due to youth; I do not think a distinct subspecies is represented.

This species may now be added to the fauna of New South Wales, specimens trawled off our southern coasts having been received from Mr. Melbourne Ward (Austr. Mus., Regd. Nos. IA. 8,094 to 8,096).

ACANTHIDIUM MOLLERI, Whitley.

Acanthidium mollerii Whitley, Rec. Austr. Mus., xx., 4, March 31, 1939, p. 264, fig. 1. East of Sydney, N.S.W.; 130 faths.

Twenty-three specimens of this species were trawled by the F.I.S. "Endeavour" in the Great Australian Bight, south and south-east from Eucla, in 130 to 450 fathoms, May, 1913. The largest is a male, twenty inches long. New record for South and Western Australia.

Family RHINOBATIDAE.

Genus RHINOBATOS Linck, 1790.

Rhinobatos Linck, Mag. neues. Physik. naturg., vi., 3, 1790, p. 32. Tautotype, *Raja rhinobatos* Linné, 1758.

Leiobatus Rafinesque, Caratt. n. gen. Sicil., 1810, p. 16. Haplo-type, *Leiobatus panduratus* Raf. = *rhinobatos* Linné.

Squatinatoraja Nardo, Oss. Adriat. Ittiol., 1824. Type, *S. colonna* Nardo—*fide* Jordan, Gen. Fish.

Glaucostegus Bonaparte, Icon. Faun. Ital. Introd. Pesc., 1841, p. 4. Haplo-type, *Rhinobatus cemiculus* Geoffroy St. Hilaire, 1827.

Syrrhina Müller & Henle, Syst. Plagiost. (3), 1841, p. 113. Logotype, *Rhinobatus columnae* Bonaparte, 1835, selected by Jordan & Evermann, 1896.

Acroteriobatis Giltay, Ann. Soc. Roy. Belg., lix., 1928, p. 26. Logotype, *Rhinobatus* (*Syrrhina*) *annulatus* Müller & Henle, 1841, by present designation.

Modern authors sometimes use the names *Rhinobatos* and *Leiobatus* for two distinct subgenera, notwithstanding that the type of the latter is regarded by them as an absolute synonym of that of the former. Norman (Proc. Zool. Soc. Lond., 1926, p. 945) gave a synopsis of the species, which may be grouped into subgenera as follows:—

Scobatus, nov., for species 1 and 2, with *Rhinobatus granulatus* Blainville, 1816, as orthotype.

Platipornax, nov. for sp. 3, *thouiniana* = *Raja thouin* Anon., 1798.

Glaucostegus for species 4 to 7.

Rhinobatos (syn. *Leiobatus*, *Squatinatoraja*, and *Syrrhina*) for Nos. 8 to 14.

Acroteriobatus for species 15 to 19.

More names may later be found necessary for some of the American species, Nos. 20 to 27. I have been unable to find a logotype-designation for *Acroteriobatus*, so select *annulatus* for the purpose.

RHINOBATOS (PLATIPORNAX) THOUIN (Anon.).

Raja thouin Anon., Allgemeine Literatur-Zeitung, iii., 287, Sept. 24, 1798, p. 677, *et ibid.*, Sept. 25, 1798, p. 685, pl. i., figs. 3-4. Latinization of Lacépède's vernacular. No locality.

This species, as *Rhinobatos thouiniana*, appears on Australian lists, but the type may have come from Surinam or South Africa, and local records refer to different species. The name of this species should be erased from our fauna.

RHINOBATOS BATILLUM, sp. nov.

(Fig. 13.)

Rhinobatos armatus, thouini, and *halavi* of Australian authors.

The figure on the next page represents an immature male specimen from Sharks Bay, Western Australia, where I obtained it in July, 1939, the species being common in sandy shallows there and easily approached. It comes down to *armatus* in Norman's key (Proc. Zool. Soc. Lond., 1926, iv., pp. 941 & 952, fig. 6) but differs from his description of that Indian species in proportions, having the preorbital length 4 times the distance between the spiracles instead of 3 to 3-1/5th, and preoral length 2½ instead of 3 times width of mouth. The eye plus spiracle is subequal to the distance between the spiracles. The space between the origins of the dorsal fins is equal to distance between origin of first dorsal and base of ventrals.

The nostrils are oblique and very long. Internarial width more than half narial diameter. Spiracle with a large outer and a small inner fold. Flat coarse denticles around eyes and along back, particularly enlarged along median line and scapulars. Anterior edges of dorsal fins similarly armed. Total length 42 inches. Length of first dorsal nearly 4½ ins.

Colour olive-greenish above. Snout gelatinous-looking. Fins yellowish. Ventral surface whitish.

The stomach contained several well-digested prawns and the head of a small flathead (fam. Platycephalidae).

As *R. armatus*, this ray has been caught in shallow waters around the north of Australia from Sharks Bay in the West, across the Northern Territory down to the Capricorn Group in Queensland. Ogilby remarks of it, "freely entering and even permanently residing and breeding in fresh water". A common size in Queensland is about two feet, but it grows to between 6 and 7 feet. A 42½ inch male which I collected at North-west Islet, Queensland, on November 27, 1925, agrees remarkably with the Sharks Bay specimen in measurements.

RHYNCHOBATUS DJIDDENSIS AUSTRALIAE, subsp. nov.

(Fig. 14.)

Australian specimens of the White-spotted Ray differ in shape and colour-markings from Indian and Red Sea illustrations, being especially wider towards the root of the tail. The type of the new subspecies is a fine specimen, trawled off the Manning River, New South Wales. A young example was sandy-brown above, the sides and pectorals with scattered white ocelli; a round black spot posteriorly on the scapular region; lower surface white, clouded with rufous; snout with transverse darker area and black spots anteriorly.

Family RAJIDAE.

Genus *RAJA* Linné, 1758.

In its broadest sense, this genus includes all the Skates of the world, but modern studies, especially following Leigh-Sharpe's analyses of the characters of the claspers and pelvic girdles, suggest that about twenty genera and subgenera should be distinguished in place of the original *Raja*. There is no lack of names for most of these: the trouble lies rather in

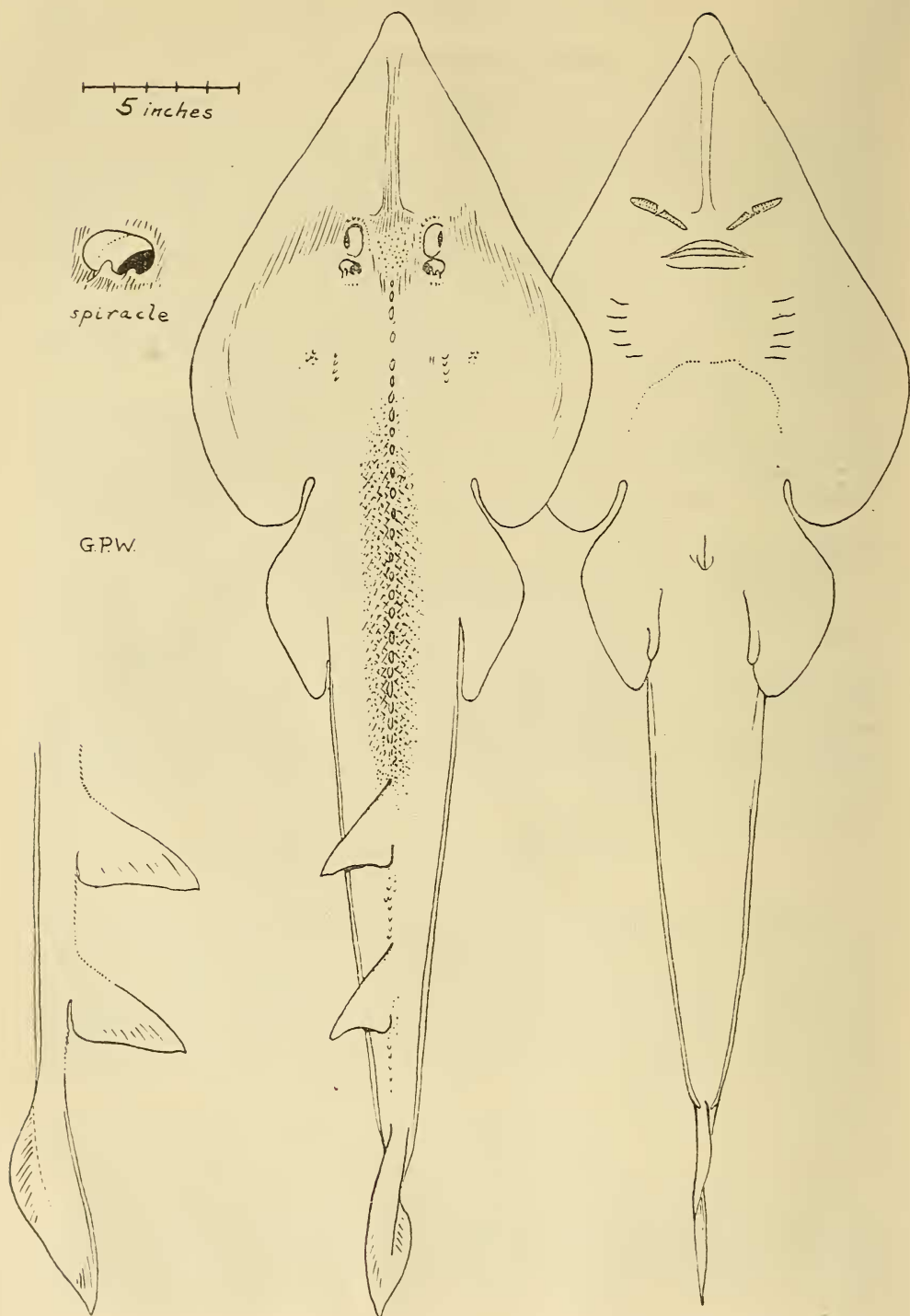


Fig. 13. *Rhinobatos batillum* Whitley. A specimen from Sharks Bay, Western Australia. G. P. Whitley del.

determining earliest available names and genotype-designations. In the main, these "synonyms" have been tabulated by Fowler (Bull. Amer. Mus. Nat. Hist., lxx., 1, 1936, p. 104), but I would add to his list *Eleutherocephalus* Agassiz (Nomencl. Zool., 1846, Index Univ., pp. 71 & 136, an emendation for *Cephaleutherus* Rafinesque), *Peroptera* and *Perioptera* Gistel (Nat. Thierr. höh. Schulen, 1848, p. x.), all based on abnormal skates. The name *Propleygia* was published in Gray's List Specimens Fish. Brit. Mus., i., Chondropt., 1851, pp. 83, 105 & 153, and seems to be an error for *Propterygia* Otto.

The genus *Raja* has been regarded as a large one, embracing so many species that sometimes the same specific name has been used for more than one species. To avoid future use of names which are preoccupied, I offer here an alphabetical list of all the specific names of *Raja* spp. (sensu

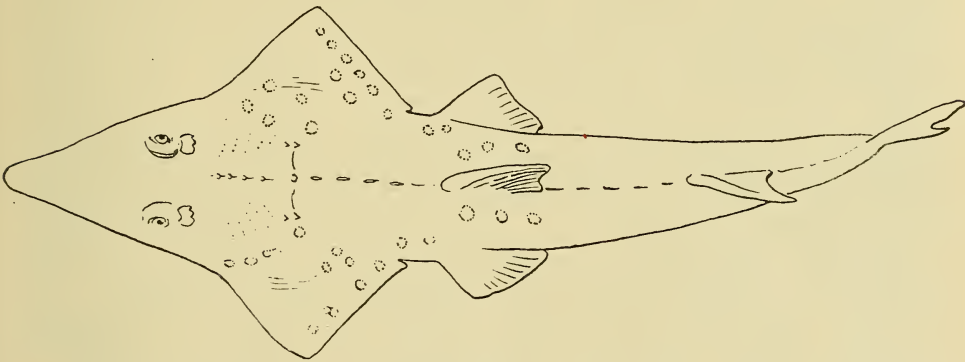


Fig. 14. *Rhynchobatus djiddensis australiae* Whitley. Holotype of subspecies, a large specimen from off Manning River, New South Wales. G. P. Whitley del.

latissimo) known to me: *abredonensis*, *abyssicola*, *ackleyi*, *aculeata*, *acus*, *acutidens*, *africana*, *agassizi*, *aguja*, *ajereba*, *alata*, *alba*, *albolinea*, *albo-maculata*, *aleutica*, *altavela*, *americana*, *andamanica*, *annandalei*, *antiqua*, *apteronota*, *aquila*, *arctowskii*, *armata*, *arnak*, *ascanii*, *aspera*, *asperrima*, *asterias*, *atra*, *atriventralis*, *aurita*, *australis*, *badia*, *banksiana*, *baracola*, *barbata*, *barnardi*, *bathypbila*, *batis*, *bavosa*, *bicolor*, Shaw, 1804, *bicolor*, Risso, 1826, preocc. (= *alba*), *binocularis*, *binocolata*, *biocularis*, *birostris*, *bispecularis*, *bispinosa*, *blanda*, *bonaespeiensis*, *bonasus*, *borea*, *borussica*, *brachyura* Lafont, 1871, *brachyura* Gunther, 1880, preocc. = *brachyurops*, *bramanta*, *brasiliensis*, *brevicaudata*, *burgeri*, *capensis* Gmelin, 1789, *capensis* Müller & Henle, 1841, preocc. (= *bonaespeiensis*), *castelnaui*, *caudaspinosa*, *cemiculus*, *cent(r)oura*, *cephaloptera*, *cerva* (sp. nov., infra), *chagrinea*, *chantenay*, *chilensis* Gay, 1848, *chilensis* Steindachner, 1898, preocc. (= *steindachneri*), *chinensis*, *ciodera*, *circularis*, *clavata*, *columbus*, *columnae*, *cooperi*, *cornuta*, *crabuda*, *cruciata*, *cuculus*, *cuvierana*, *cuvieri(i)*, *cuvieriana*, *cyclophora*, *dentata*, *desmaresti*, *diabolus*, *diabolus marinus*, *diaphanes*, *dipterygia*, *djiddensis*, *doello-juradoi*, *durbanensis*, *dux*, *eatonii*, *echinorhyncha*, *edentula*, *eglanteria*, *episcopus*, *equatorialis*, *erinacea*, *estrellada*, *extenta*, *fabroniana*, *falsavela*, *fasciata* Shaw [a *Myliobatis*], *fasciata* Bleeker, 1855 [An *Aptychotrema*], *fasciata* Müller & Henle [= *Trygonorrhina*], *fenestrata*, *fimbriata*, *flagellum*, *flavirostris*,

flossada, *fluviatilis*, *freminvillei*, *fullae*, *fullonica*, *fusca*, *fyllae*, *gaimardi*, *gallardo*, *gallica*, *garmani*, sp. nov. (for *ornata* Garman, 1881, preocc.), *gentili*, *georgiana*, *gesneri*, *giorna*, *giorniana*, *gotoi*, *granulata*, *granulosa*, *griseocauda*, *guttata* Bloch & Schneider, 1801 [a *Dasyatis*], *guttata* Shaw, 1804, preocc. [a *Stoasodon*], *halavi*, *hispanica*, *hollandi*, *horraeka*, *hyperborea*, *hyposticta*, *imbricata*, *inermis*, *ingolfiana*, *inornata*, *intermedia*, *interrupta*, *isotrachys*, *jamaicensis*, *japonica*, *joenia*, *johannis-davisi*, *joenia*, *jordan*, *jussieu*, *karagea*, *katsukii*, *kenojei*, *kincaidii*, *kujiensis*, *kunsua*, *laevis*, *latastei*, *leiobatos*, *lemprieri*, *leopardus*, *leucobatos*, *levis*, *ligonifer*, *lima*, *lineata*, *linteria*, *lipacantha*, *lymma*, *lymna*, *lymnia*, *lymnoea*, *machuelo*, *macloviana*, *maclura*, *macrocephala*, *macrorhynchus*, *maculata* Shaw, 1804, *maculata* Montague, 1818, preocc. (= *montagui* = *oculata*), *maculata* Jenyns, 1835 (= *miraletus*), *madarensis*, *maderensis*, *magellanica*, *mamillidens*, *manatia*, *marginata* Lacépède, 1803, *marginata* Risso, 1826, preocc. (= *alba*), *maroccana*, *marplatensis*, *meerdervoorti*, *megarhynchus*, *melitensis*, *meta*, *microcellata*, *microps*, *microtrachys*, *micrura*, *minor*, *mira*, *miraletus*, *mobular*, *molaridens*, *monstrosa*, *montagui*, *montereyensis*, *morula*, *mosaica*, *motoro*, *mucosa*, *mucosissima*, *mucronata*, *mula*, *multispinis*, *muricata*, *murrayi*, *mus marinus*, *naevus*, *narce*, *narcus*, *narinari*, *nasuta*, *nazinari* & *neruari* Van Hasselt, 1823 (= *narinari*), *nidarosiensis*, *niehofi*, *nigra*, *nitida*, *noctula*, *obtusa* Klunzinger, 1871, *obtusa* Gill & Townsend, 1897, preocc. (= *rosispinis*), *ocellata*, *ocellifera*, *oculata*, *ogilbyi*, sp. nov. (infra), *ommes-scherit*, *omirnovi*, *orbicularis*, *ornata*, Agassiz, 1843, *ornata* Garman, 1881, preocc. (= *garmani*, sp. nov.), *osbeckii*, *oxyptera*, *oxyrinchus*, *parcomaculata*, *parmifera*, *parvidens*, *pastinaca*, *pennanti*, *pentagona*, *percellens*, *philipi*, *picta* Lacépède, 1802, *picta* Ribeiro, 1904, preocc. (= *ribeiroi*), *pigara*, *platana*, *platypterus*, *plutonia*, *poecilura*, *polyommata*, *polyophthalmus*, *polystigma*, *pontica*, *porosa*, *powelli*, *primarmata*, *pulchra*, *punctata*, *quadriloba*, *quadrinaculata*, *quatuoroculus*, *quinqueaculeata*, *quinquemaculata*, *radiata*, *radula*, *rapensis*, *reversa*, *rhina*, *rhinobates* or *rhinobatos*, *rhizacanthus*, *rhomboidalis*, *ribeiroi*, *rosispinis*, *rostellata*, *rostrata* Shaw & Nodder, 1794, *rostrata* Lacépède, 1802, preocc., *rostrata* Risso, 1810, preocc. (= *oxyrhinchus*), *rostrata* Taylor, 1855 [= *Bathytoshia breviceaudata*], *rostrata* Castelnau, 1873 (= *whitleyi*), "*ruber* Bloch" Garman, 1913 [error for *rubus*], *rubra* Swainson, 1838, *rubus*, *salviani*, *sancur*, *say*, *scabra* Linné, 1764, *scabra* Latreille, 1804, preocc. (= *fullonica*), *scabra* Ogilby, 1888, preocc. (= *whitleyi*), *scabrata*, *scaphiops*, *scherit*, *schlegeli*, *schonkie*, *schoukia*, *schou(s)kie*, *schultzii*, *scobina*, *senta*, *sephen*, *siamensis*, *sibogae*, *similis*, *sinensis*, *sloanii*, *smirnovi*, *smithii*, *speculum*, *spinacidernis*, *spinicauda*, *spinosa*, *spiralis*, *squatinoraja*, *stabuliforis*, *steindachneri*, *stellaris*, *stellatus*, *stellulata*, *sueta*, *tajara*, *tengu*, *texana*, *thouin(i)*, *thouiniana*, *timlei*, *tobae*, Tanaka, 1916, *tobae* Tanaka, 1927, preocc. (= *karagea*), *torpedo*, *trachura*, *trigonoides*, *tuberculata* Bonaterre, 1788, *tuberculata* Lacépède, 1802, preocc. [= *Dasyatus guttatus* (Bl. Schn.)], *uarnak*, *undulata*, *vespertilio*, *violacea*, *virgata*, *vomer*, *vulgaris*, *waitii*, *whitfieldi*, *whitleyi*.

RAJA GARMANI, sp. nov.

This new name is proposed for *Raja ornata* Garman (Bull. Mus. Comp. Zool. Harvard, viii., 1881, p. 234), preoccupied by *Raja ornata* Agassiz (Poiss. Fossiles. iii., 1843, p. 372).

RAJA CERVA, *sp. nov.*

(Plate xx., fig. 1.)

"White-spotted Skate, *Raja* sp." Whitley, Austr. Mus. Mag., vi., 11, Nov. 8, 1938, p. 380, fig. 19 (egg-case from Bass Strait).

Disc (78 mm. wide), much wider than long, and about two-thirds of the total length (118). Anterior margins undulated and slightly asymmetrical, the outer angles rounded. Vent nearer tip of snout than end of tail. Snout obtusely pointed, its length (15 mm.) less than one-fifth width of disc. Teeth minute, spaced. Eye (7) equal to interorbital space (7) and less than half snout. Internasal width (10) equal to width of mouth (10), and 1.8 in preoral length (18). Spiracle small, slit-like, behind and close to eye.

Surfaces mainly smooth. No bucklers. Two strongly diverging spines before each eye and one outwardly directed postocular spine. One large median nuchal spine, a row of twelve spines along the top of the tail, and another spine between dorsal fins. Tail depressed, with lateral folds which cease before the pointed tip. Two separate rounded dorsal fins; behind the second is a skinny crest extending to tip of tail.

Colour in formalin, varying shades of brown from light tan to dark brown on the dorsal surfaces. Disc with scattered white or yellowish nebulous spots above. Tail with a few indistinct dark brown cross bars, darkest where they extend on to dorsal fins. Edges of disc and tip of tail buff. Eyes bluish. Ventral surfaces pale yellowish, somewhat dusker towards margins of fins. No pigmented pores on lower surface of disc.

Described and figured from the holotype of the species, a young male, 78 mm. wide or about 4-5/8 inches in total length. Austr. Mus., Regd. No. E. 4,970.

Locality.—25 miles N.E. of Babel Island, Bass Strait, north of Tasmania; 70 to 100 fathoms (F.I.V. "Endeavour", April 4, 1914).

This species differs from the Common Skate, *Raja australis* Macleay, in having a less produced snout, in its proportions, spinulation and colouring. There are three rows of spines in the grown female instead of five (one in the male), and the back is distinctly white-spotted. The late A. R. McCulloch, when aboard the F.I.V. "Endeavour", found the species not uncommon in the trawl off Babel Island, Bass Strait, and preserved several small specimens. He noted that large examples develop large spines over the anterior portions of the pectoral fins.

Amongst the paratypes in the "Endeavour" collection, two (Nos. E. 4898-4899) were taken with the holotype, whilst one (E. 5491) was trawled south of Gabo Island, Victoria; 200 fathoms, October 6, 1914. The latter is about the same size as the holotype, but has no white spots on back and the fin-margins are dusker. The species thus ranges from Victoria to north of Tasmania.

Egg-case.—The egg of this species is of the usual quadrangular *Raja* type, one (No. E. 4973) is $2\frac{3}{4}$ by $1\frac{1}{2}$ inches and invested with pale greenish, slimy fibres. This was figured in the Australian Museum Magazine, vi., 1938, p. 380, fig. 19.

RAJA WHITLEYI Iredale.

? *Raja dentata* Klunzinger, Arch. Naturg., xxxviii., 1, 1872, p. 46. Port Phillip, Victoria. Type in Württembergische Naturaliensammlung,

- Stuttgart, seen. *Id.* Klunzinger, Sitzb. Akad. Wiss. Wien., lxxx., 1, 1879, p. 429, and of Australian lists. See also p. 251, fig. 16 of this paper.
- Raja oxyrhynchus* Castelnau, Proc. Zool. Acclim. Soc. Vict., i., July 15, 1872, p. 224. Melbourne market. Not *Raja oxyrinchus* Linné, Syst. Nat., ed. 10, 1758, p. 231, from Europe.
- Raja rostrata* Castelnau, Internat. Exhib. Essays, 1872-1873, No. 5 (before May), 1873, p. 17. Melbourne, Victoria. New name for *R. oxyrhynchus* Cast., non Linné, but thrice preoccupied by *Raja rostrata* Shaw & Nodder, Nat. Miscell., v., 1794, pl. clxxiii., from Botany Bay; *Raja rostrata* Lacépède, Hist. Nat. Poiss., iv., 1802, p. 669, from France; *Raja rostrata* Risso, Hist. Nat. Eur. Merid., iii., 1826, p. 156, from the Mediterranean. Not *Raja rostrata* Taylor, Te Ika a Maui, ed. 1, 1855, p. 412, from New Zealand [= *Bathytoshia breviceaudata* (Hutton)].
- Raja rostrata* Castelnau, Proc. Zool. Acclim. Soc. Vict., ii., May, 1873, p. 57.
- Raja rostrata* Macleay, Proc. Linn. Soc. N.S.W., vi., Sept. 12, 1881, p. 376; Descr. Cat. Austr. Fish., ii., 1881, p. 312.
- Raja scabra* Ogilby, Cat. Fish. Austr. Mus., i., 1888, p. 17. Manly, N.S.W. and Port Phillip, Victoria (latter designated type-loc.). New name for *Raja rostrata* Castelnau, preocc., but itself preocc. by *Raja scabra* Linné, Mus. Adolph. Frid., ii., 1764, p. 52, from the Mediterranean, and by *Raja scabra* Latreille, Nouv. Dict. Hist. Nat., ed. 1, xxiv., 1804, p. 72, footnote, from Britain.
- Raja scabra* Waite, Mem. N.S.W. Nat. Club, ii., 1904, p. 10. *Id.* Engelhardt, Abh. K. Akad. Wiss. Bayern, iv. (3), 1913, p. 103.
- Raja scabra* Lucas, Proc. Roy. Soc. Vict. (2), ii., 1890, p. 46. *Id.* Stead, Ed. Fish. N.S.W., 1908, p. 119. *Id.* Ogilby, Mem. Qld. Mus., iii., 1915, p. 133. *Id.* McCulloch, Austr. Zool., i., 1919, p. 225; and Austr. Zool. Handbk., i., May 16, 1922, p. 11.
- Raja nasuta* Garman, Mem. Mus. Comp. Zool. Harv., xxxvi., 1913, p. 366. Synonymy. Not *Raja nasuta* Müller & Henle, Syst. Plagiost. (3), 1841, p. 150, ex Banks, MS., from "Südsee", i.e., Totaeranue, New Zealand.
- ? *Raja scabra* Whitley, Austr. Mus. Mag., vi., 1938, p. 381, figs. 22-24 (egg-cases ascribed to the Great Skate, though Castelnau described eggs as "of a silky green").
- Raja whitleyi* Iredale, Austr. Zool., ix., 2, Nov. 30, 1938, p. 169. Port Phillip, Victoria. New name for *Raja scabra* Ogilby, preocc. by Linné.
- Because of its gigantic size, there is no good specimen of this skate in any Museum. If *Raja dentata* be the young of this species, then its name will take precedence; this seems unlikely, however, especially as no intermediate specimens have been obtained. In 1873, Count F. de Castelnau (International Exhibition Essays, 1872-1873, No. 5, Notes of the Edible Fishes of Victoria, p. 17) mentioned that "several sorts of Rays are brought to the market; the two most common are the *Raja Lemprieri*, of which the male has two or three series of crooked spines on the pectoral, and a sort I had taken for the *Raja Oxyrhynchus* of Europe, but which seems to be different, and that I will call *Raja rostrata*". Ogilby showed that *rostrata* was preoccupied and renamed it *scabra*, but Iredale found a prior *scabra* which invalidated Ogilby's name and called it *whitleyi*, designating Port Phillip as type-locality. The Great Skate of New South Wales (Ogilby's Manly specimen) appears distinct again and is accordingly described as *Raja ogilbyi*, sp. nov.

RAJA (SPINIRAJA) OGILBYI, *subg. et sp. nov.*

(Fig. 15.)

Raja rostrata Ogilby, Town & Country Journal (Sydney), Sept. 24, 1887, p. 654, fig. —.

Raja scabra Ogilby, Cat. Fish. Austr. Mus., i., Palaeichth., 1888, p. 17. Manly specimen only. Not the Port Phillip type which is *whitleyi* Iredale.

The large skin catalogued by Ogilby is still in the Australian Museum though its tail is missing. It has the following characters.

Snout acute. Anterior margin bisinuate. Width of disc (52 inches) greater than its length (38). Interorbital broad and sunken. Eyes small. Spiracles large. Ventrals not much excavated. Specimen is female, so no claspers. Whole of top and bottom of disc with spaced spines making the skin very rough; one or two enlarged spines on middle of back between ventral fins; no enlarged spines around eyes. The vent was probably nearer the end of tail than tip of snout. No pigmented pores below disc.

Mouth broad with 46 rows of teeth in upper jaw and 40 in lower, worn mesially. The two-rooted teeth are somewhat rhombic in outline, with a pyriform crest towards which converge several ill-defined ridges. Nasoral fold with a pointed lobe just behind nostril. Nostril flaps not large.

Colour now dark reddish brown above, lighter below.

Described and figured from a specimen (Austr. Mus. Regd. No. I. 1346), said to have been 6 feet long and over $4\frac{1}{2}$ feet wide.

Locality.—Manly, New South Wales; purchased for 25/- in July, 1887.

This old skin is the only specimen I have of the local Great Skate. It is possible that *R. rostrata* Cast., preocc. = *R. scabra* Ogilby, preocc. = *R. whitleyi* Iredale, from Port Phillip, Victoria, is the same species as *R. dentata* Klunzinger. Further specimens are, however, required to study the changes with growth before large specimens such as this one can be identified with the Melbourne species. Ogilby's Manly example differs from *dentata* in proportions of eyes, interorbital, and snout, in the lobed nasoral groove, and in minor respects concerning the spinulation of the body and the form of the teeth. These may be due to age, or they may indicate specific separation.

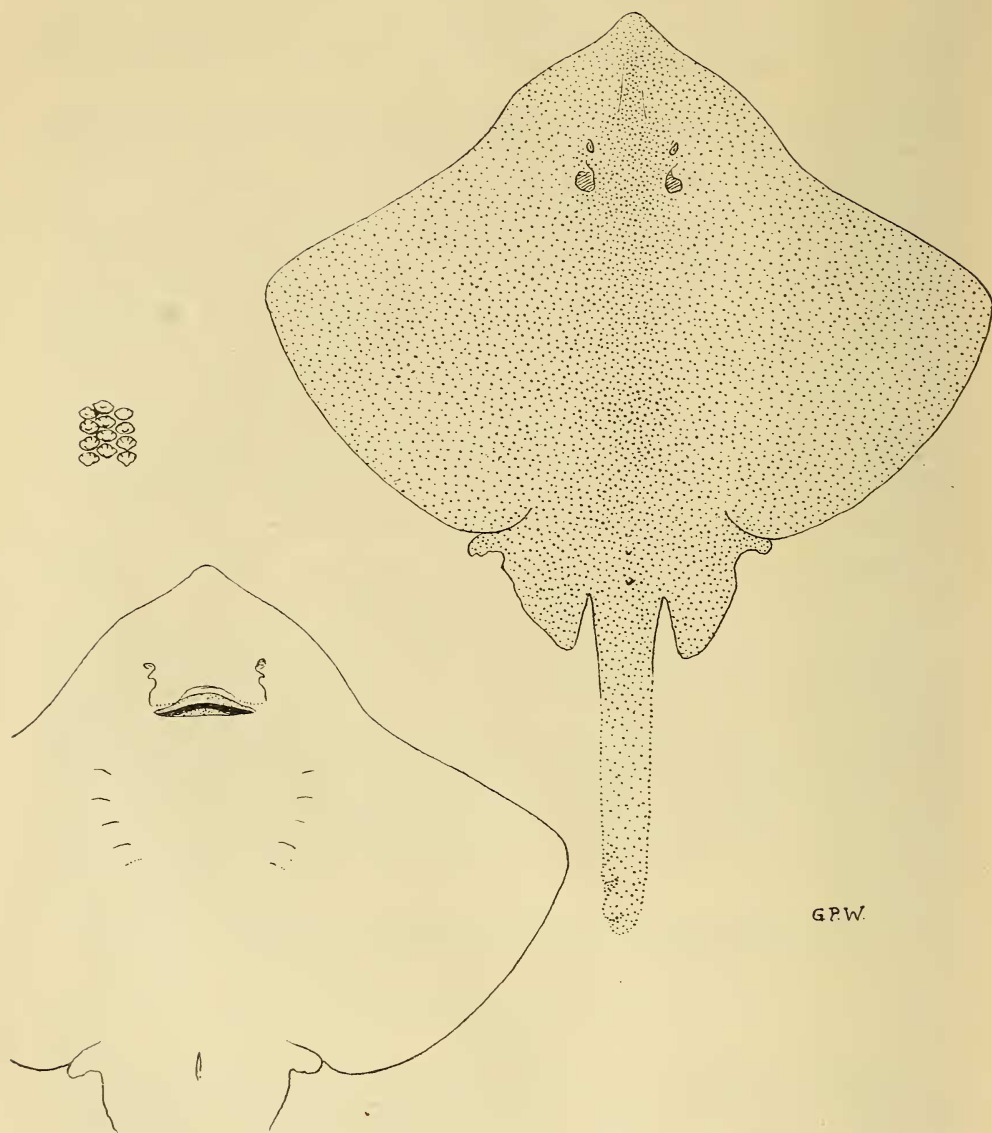
The new subgeneric name *Spiniraja* is proposed for *Raja ogilbyi*, since it differs from true *Raja* in being very spiny above and below.

RAJA DENTATA Klunzinger.

(Fig. 16.)

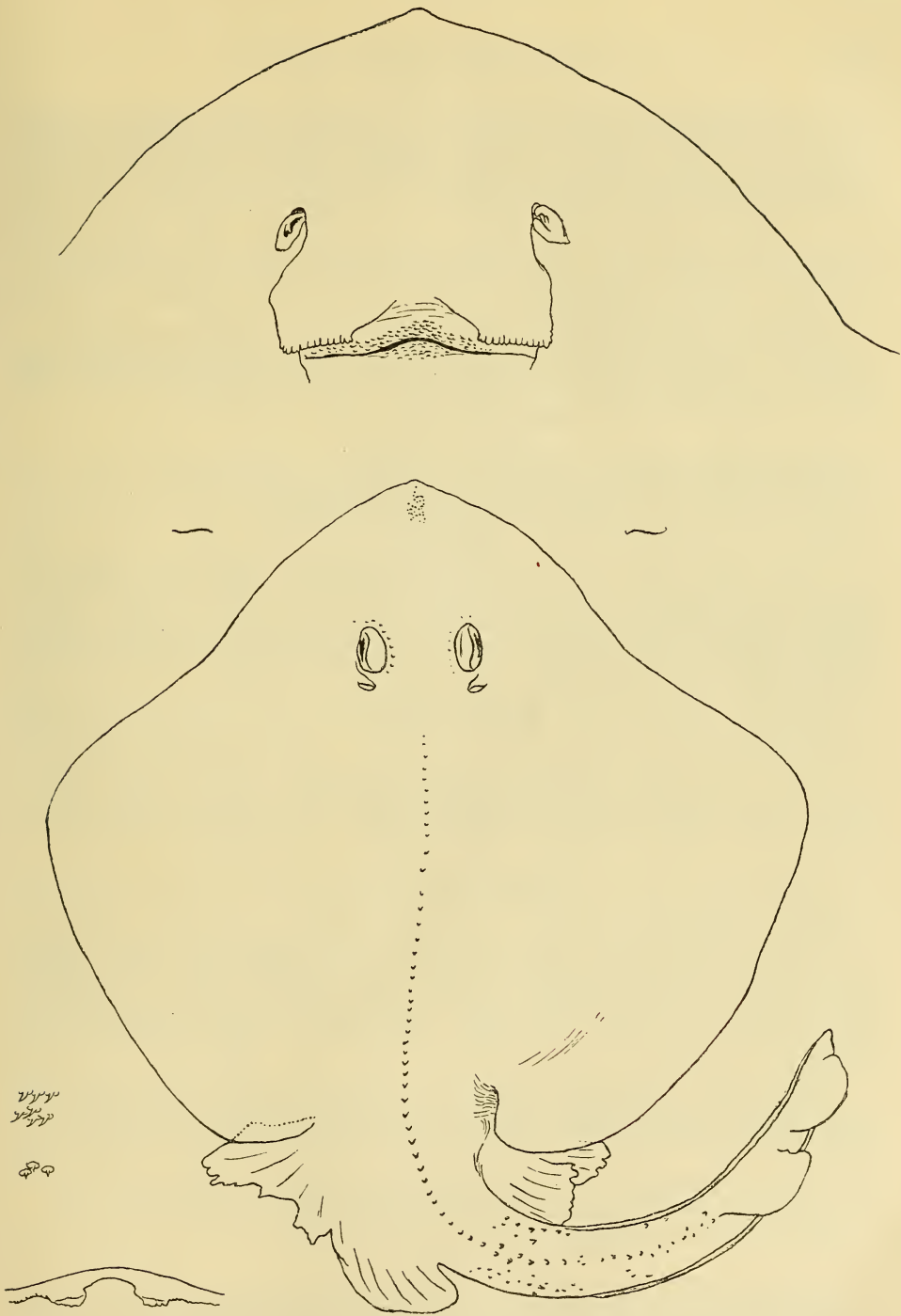
Through the kindness of Dr. M. Rauther, I have been able to examine the types of this species, preserved in the Württembergische Naturalien-sammlung, Stuttgart, Germany. A figure of the lectotype is given here.

There are two types in Stuttgart labelled "Port Philipp, Australien, v., Müller, 1869-1871". I select the larger as lectotype. The specimen, a female, is slightly shrivelled, measuring approximately 285 mm. from snout to vent and about 245 from vent to end of tail. Width of disc, 330 mm.; snout to pectoral margin about 305. Teeth quincunx, with pointed crowns. Numerous denticles almost embedded in integument, a median row of larger denticles, about 40 before root of tail (the second specimen is even more



GPW

Fig. 15. *Raja* (*Spiniraja*) *ogilbyi* Whitley. Holotype from Manly, New South Wales (Austr. Mus., Regd. No. I.1346). Tail reconstructed. Inset shows teeth G. P. Whitley *del.*



G.P.W.

Fig. 16. *Raja dentata* Klunzinger. Lectotype from Port Phillip, Victoria.
 Lower left: Teeth, velum maxillare, and buccal processes.
 (Württemberg. Nat. Mus., Stuttgart, No. 1658, 1816). . G. P. Whitley del.

spiny, having denticles between eyes, on snout, and sides, and with pores on ventral surface of head. A fold on each side of tail reaching to end. Brown with a few indistinct darker blotches. Velum maxillare crinkled, emarginate mesially; about five short buccal processes, but these soft parts may have shrunk in preservative.

In 1879, Klunzinger recorded the male of this species. His specimen has sharp hook-pointed teeth. The spines are sharper than those of the female and there are only about 4 by the eye instead of about a dozen. Two rows of spines form the tenacula.

Another Melbourne specimen is in the Australian Museum (Regd. No. I. 12050); it agrees well with the type and has the following characters: 38 rows of teeth, spiny above and below disc, vent slightly nearer tip of tail than end of snout and no pigmented pores on lower surface.

ZEARAJA, gen. nov.

Orthotype, *Raja nasuta* Müller & Henle, 1841, from New Zealand.

ZEARAJA NASUTA (Müller & Henle).

(Plate xxi.)

This species has a produced snout, "shouldered" pectorals, surface of disc rough above and with blackish pits below. A median row of strong spines along tail, one on middle of back, and a few near the eyes. Here figured from a young example nearly 11 inches wide from the Portobello Marine Hatchery, New Zealand (Austr. Mus., No. IA. 7087).

RIORAJA, gen. nov.

Orthotype, *Uraptera agassizi* Müller & Henle = *Rioraja agassizi*.

This new name is devised to replace *Uraptera* Müller & Henle (Ber. Verh. k. pr. Akad. Wiss., 1837, p. 117; Mag. Nat. Hist. (Charlesworth) (n.s.), ii., 1837 (early 1838), p. 90, and Plagiost., 1841, p. 155), which is clearly pre-occupied by *Uraptera* Billberg, 1820, a genus of Lepidoptera.

PAVORAJA, gen. nov.

Orthotype, *Raja nitida* Gunther = *Pavoraja nitida*.

Snout produced into a small fine point. Eyes large. Disc heart-shaped in outline, the pectorals being rounded, not "shouldered". Upper parts generally with minute asperities. A few curved spines at eyes, one in middle of back, and a median row of spines before tail. Lower surface smooth. Coloration ornate, with small ocelli. Size small (maximum length 13½ inches).

Besides the type-species, which is trawled in 70 to 90 fathoms in southern New South Wales, Victoria and across Bass Strait to Tasmania, there is the northern species, *Pavoraja polyommata* (Ogilby) from Queensland.

Other new generic names will probably be found necessary for certain foreign skates, but these need not be proposed here.

PAVORAJA POLYOMMATA (Ogilby).

(Plate xxii., fig. 1.)

In 1910, Ogilby read a paper "On Some New Fishes from the Queensland Coast" before the Royal Society of Queensland. Reprints of the paper were distributed, but it was not published in the official proceedings of the

Society; details have been given by McCulloch (Biol. Res. Endeavour, ii., 1914, p. 79). The only elasmobranch described in Ogilby's paper was *Raja polyommata*, but the name must be regarded as a *nomen nudum* until defined in a recognized publication. A short description was given by Ogilby in Mem. Qld. Mus., v., 1916, pp. 86 & 95, so the name can be regarded as valid from July 10, 1916.

A figure is here given for the first time, prepared by Miss Joyce Allan from one of Ogilby's co-types, a female, $8\frac{1}{2}$ inches long by $5\frac{1}{2}$ wide.

Locality.—38 miles N.E. of North Reef, off Rockhampton, Queensland; trawled in 75 fathoms, shell and mud bottom, by the F.I.S. "Endeavour" in 1910. Specimen now designated lectotype, Austr. Mus., Regd. No. I. 10904.

IROLITA WAITII (McCulloch).

In a popular article on the eggs of Australian Sharks and Rays (Austr. Mus. Mag., vi., 11, 1938, pp. 372-382, figs. 1-28), I tentatively identified a Victorian egg as that of the Round Ray, *Irolita waitii*, although this species had not then been recorded from Victoria. The egg is very different from that of the allied *Psammobatis* described in the Proceedings of the U.S. Nat. Mus., Vol. 1. (fifty), 1916, pp. 404 & 421.

However, in the "Endeavour" collection there are specimens of the Round Ray trawled on the eastern edge of Bass Strait between Gabo and Flinders Islands, outside the 100 fathom line (Regd. No. E.4603), so that the inclusion of Victoria in the range of this species is correct whether the egg be correctly ascribed to it or not. The "Endeavour" also trawled this species in the Great Australian Bight, west from the meridian of Eucla, in 70 to 120 fathoms.

Family UROGYMNIDAE, *nov*.

UROGYMNUS ASPERRIMUS SOLANDERI, *subsp. nov*.

(Fig. 17.)

A large kind of ray was caught by Cook's men in 1770 off the Endeavour River, now in North Queensland. I found a manuscript latin description of it amongst Solander's MSS in the British Museum (Natural History). Solander called it "*Raja radula*" but that name is not available for publication now because it has already been used for a European skate (by Delaroche in 1809). Solander's description appears to fit the Thorny Ray (*Urogymnus*), to which I now give a new subspecific name to distinguish it from the Bombay type of the species. Mr. H. A. Longman has lent me the teeth, velum maxillare, and buccal processes of the holotype of my new subspecies (Qld. Mus., Regd. No. I.13/1112), a specimen from Darnley Island, Queensland, collected by J. Tosh and here figured. I have no complete Australian specimen, only an expanse of skin from the Gilbert or Line Islands in the Australian Museum, so have modified Day's figure in the *Fishes of India* for purposes of illustration.

The following is Solander's MS. description:—

"Corpus supra glaucum undique tuberculis acutis asperatum; subtus laeve, albidum.

Cauda brevis (1-pedalis) angusta, inspinis, sed forte olim mutilata, teres, undique tuberculis aspera. Rostrum obtusiusculum. Penes latiusculi, cauda triplo breviores. Dentes plani, truncati, mutici, imbricati.

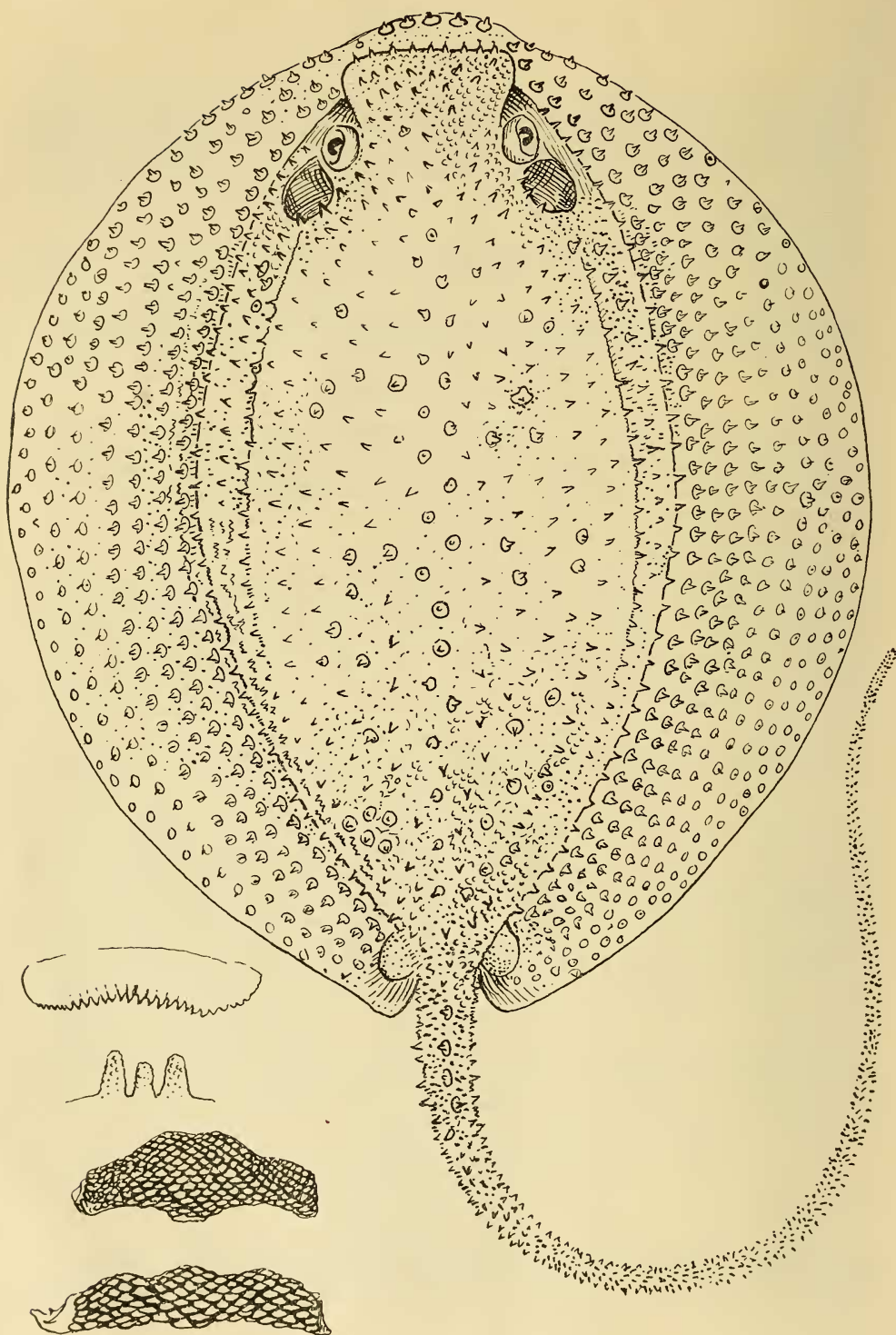


Fig. 17. *Urogymnus asperrimus* (Bloch & Schneider). Whole animal, modified from Day, *Fishes of India*, and teeth, velum maxillare, and buccal processes of subspecies *solanderi* (Qld. Mus., Regd. No. I.1112) from Darnley Id., Queensland.

Raja corpore supra undique tuberculis acutis scabro, subtus laevi, dentibus planis, imbricatis, truncatis.

Habitat in Oceano prope Endeavour River Novae Hollandiae. Pondus 110 Librarum."

Family UROLOPHIDAE, *nov.*

UROLOPHUS (TRYGONOPTERA) MUCOSUS, *sp. nov.*

(Plate xx., fig. 2.)

Breadth of disc (224 mm.) greater than its length (205), and subequal to length from snout to end of ventral fins (223).

Tail measured from middle of vent (175), 1.08 in length from middle of vent to tip of snout (190), but more than its distance from mouth (147).

Eye pupil (10), 3.7 in interocular space (37) which is greater than minimum interspiracular space (35), 1.2 in preocular portion of head (47).

Internasal width (17), 2.6, width of mouth (18) 2.5 in preoral length (45).

Front lobe not notably angular or separated from rest of disc. Anterior pectoral margins sinuous, outer angles rounded; postero-lateral margins a little convex, their junction with the inner margins rounded.

Eyes prominent, fairly large, about half interorbital.

Spiracles large, lunate, without angular projections.

Nostril flap large, extending back to level of mouth. Internasal valve plicate, with a median sulcus and long-fringed frenum. Labial folds forming pockets behind mouth. Teeth in quincunx arrangement and with blunt elevated crowns (at least in the male). Velum maxillare not markedly papillate or fringed. A few spaced simple buccal processes. Chin plicate.

Five gill-slits, body and fins as usual in *Urolophus*, the back extremely slimy. Ear-openings, lateral line, sensory and ampullary canals inconspicuous externally.

Tail depressed, without lateral folds, its width (20 mm.) between the ventral fins is more than width of mouth, and its length, from middle of vent, is less than its distance from the snout. Sting (42 mm. long) overlies a rudimentary second one, and is inserted on anterior half of tail. No dorsal fin. Claspers 37 mm. long; abdominal pores minute. Caudal fin long and narrow, its depth (11 mm.) much less than internarial width. The caudal fin originates below the proximal part of the sting on the dorsal surface and extends ventrally as a ridge reaching below anterior part of sting.

Colour (after 17 years in alcohol) fairly uniform greyish to greyish-brown above, becoming blackish on caudal fin. Under surfaces yellowish with smoky brown margins to disc and ventral fins, also some dark blotches along middle of tail.

Described and figured from the male holotype, the larger of two specimens 5 to 9 inches wide, or 369 mm. in total length (a little over 14 inches).

Locality.—Albany, King George's Sound, Western Australia; November 19, 1921. Collected by Messrs. E. Le G. Troughton, H. S. Grant and J. H. Wright. Austr. Mus., Regd. No. IA. 670 (holotype) and 671 (paratype).

Affinities.—Distinguished from all its Australian congeners by its proportions and coloration, this new species is nearest *testaceus*, from which it

differs in the proportions of the snout, nostril, and mouth areas, in having more lobes on the frenum, and in lacking the projecting angular inner margin of spiracle.

It is of historic interest to record that, amongst the drawings of fishes from King George's Sound made by Deputy Assistant Commissary General J. Neill in the 1840's and now in the British Museum (Natural History), is one numbered 38 and labelled "Young Sting Ray. Kejetuck or Bebil". It apparently represents this species, and the names given are Australian aboriginal.

Family DASYATIDAE.

HIMANTURA TOSHI, *sp. nov.*

Himantura arnak or *uarnak* of Australian authors, not "*Raja arnak*" Forskal, Descr. Anim., 1775, p. ix., non-binomial, from the Red Sea.

The Coachwhip Ray of Australia requires a new name since Forskal's is non-binomial and his brief description is inapplicable to our form. The very long tail, generally two to three times the length of the body, and lacking cutaneous folds, is characteristic. The coloration of the disc is very variable: I have seen living specimens at Broome, caught at the same time and place, with plain, spotted or reticulated backs. The back usually has a single median spine, but may be smooth in the young and studded with rough denticles in adults. Australian specimens, so far as is known, do not reach the width of five feet claimed for the extralimital *arnak*.

Named after the late Dr. James R. Tosh who figured the species in his excellent "Notes on the Habits . . . of the Common Food Fishes of Moreton Bay" (Parliament. Rept. Qld. C.A., 74-1903, Rept. Marine Dept., 1902-1903, Append., No. 7, p. 4, pl. v., fig. 2). After having been associated with the Fisheries Board of Scotland, Tosh came to Australia and pioneered the work of investigating the eggs and young of our commercial fishes as Marine Biologist to the Queensland Government. He then became Professor of Biology at St. Andrew's University, and eventually met his death in Mesopotamia.

Holotype (Austr. Mus., Regd. No. IA. 39) from the Clarence River estuary, New South Wales, and recorded by D. G. Stead, Addit. Fish-Fauna, N.S.W., i., 1907, p. 2.

Family AETOBATIDAE.

MYLIOBATIS HAMLYNI Ogilby.

(Fig. 18.)

Myliobatis hamlyni Ogilby, Ann. Qld. Mus., No. 10, Nov. 1, 1911, p. 40, and of later Queensland lists.

Mr. H. A. Longman, Director of the Queensland Museum, kindly sent me Ogilby's holotype for figuring. The teeth and spine have been removed from the specimen, and the width of the disc is now 270 mm. It is an immature male and may even be a juvenile of *australis*, but I keep the two species apart until intermediate specimens are found. Ogilby's *hamlyni* has narrower teeth, longer tail, different colour, and slightly differently formed head from the southern species.

Locality.—Cape Moreton, South Queensland; deposited in the Queensland Museum by the Amateur Fishermen's Association of Queensland. No. I. 1567.

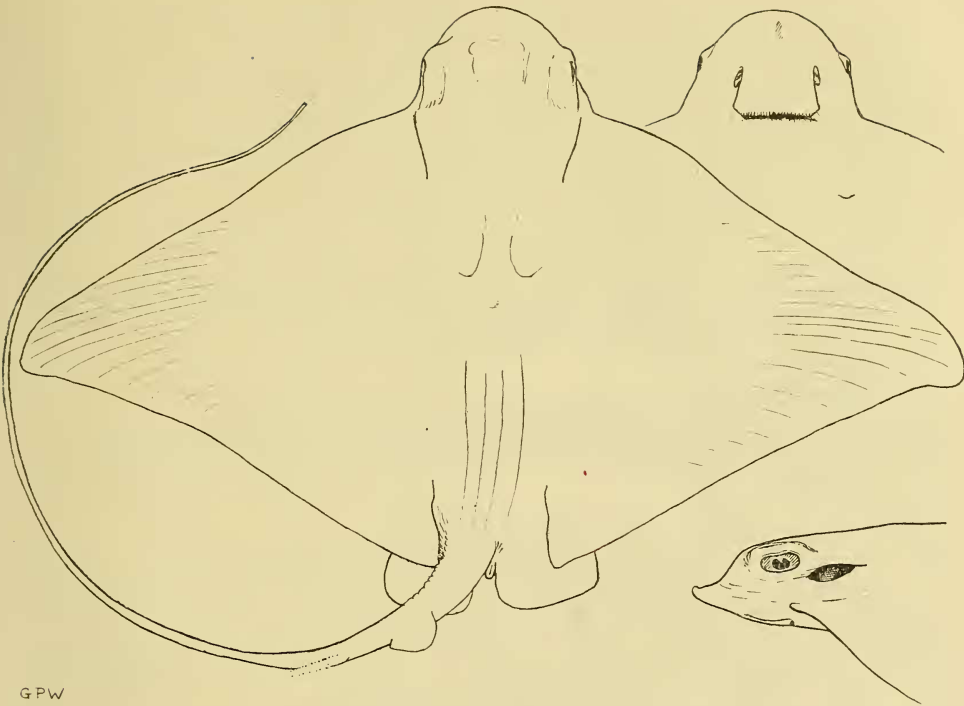


Fig. 18. *Myliobatis hamlyni* Ogilby. Holotype from Cape Moreton, Queensland (Qld. Mus., Regd. No. I.1567). G. P. Whitley del.

DEVIL RAYS (fam. Ceratopteridae & Mobulidae).

Since my paper on the Australian Devil Ray appeared in the Australian Zoologist (viii., 1936, 164), I have consulted books, manuscripts, and specimens in different Museums and have a few notes to add.

The type of *Ceratoptera ehrenbergii* Müller & Henle from the Red Sea is in the Zoologisches Museum der Universität, Berlin. It is a *Manta* (Whitley, loc. cit., p. 183) with terminal mouth, fair-sized dorsal fin, short thin tail without spine, small ventrals, and rough integument.

To the synonymy of Shaw's *Mobula diabolus* (loc. cit., p. 185) add *Cephaloptera tatarianana* Van Hasselt, *Algemeene Konst- en Letter-Bode*, i., May, 1823, p. 316, based on Russell's pl. ix., type of Shaw's species. Van Hasselt's name appears to have been overlooked by zoologists but is listed in Sherborn's *Index Animalium*, 1801-1850 (June, 1931), p. 6390; the rare book in which it was proposed was consulted in the British Museum, Bloomsbury.

Mobula rochebruni (Whitley, loc. cit., p. 187) should be *rochebrunei*. Vaillant's original description, which I saw at the British Museum (Nat. Hist.), South Kensington, states that there are teeth in both jaws, there being 50 from side to side and 10 from front to back ("une cinquantaine de rangées transversales et une dizaine en profondeur").

In the library of the Museum of Natural History, Jardin des Plantes, Paris, there are stacks of old manuscripts and drawings relating to fishes, many of them Australasian species. There is a particularly historic series of drawings and notes on Devil Rays, including LeSueur's original MSS and figures of the American species, drawings of Milbert's New York specimen and of a Kingston (Jamaica) one and Bancroft's autographed manuscript account of the same. Some of the Devil Ray drawings are very old and were used by Lacépède, whose type-localities were not always given. Thus I saw the original drawings of the following:—

1. Raie banksienne. Drawn in water as it swam following an Eastindiaman.
2. Raie manatia. Type-locality, on the ancient original drawing: America.
3. Raie frangée. Original drawing has Remorae. Loc.—Lat. N. 38°18min.; Long. S. [? West] of Paris 42°10min.; 23/7/1782.
4. Raie giorno.
5. Raie giorno.
12. Raie fabronienne. A *Mobula* from no stated locality.
14. A Devil Ray with white chevron-marks on shoulders. No locality.
15. A tracing from Barbot, Coll. Voy. & Travels, v., 224, pl. 29. Whipray, *Mobula*?
- 18-19. Aodon cornu. In this case, a *Mobula*.
22. A poor drawing. Loc.—28°N. by 65°W. July, 1827.
26. *Cephalopterus*, Cap bonne Esperance. Bears an unpublished new name from Quoy & Gaimard's MS.
- , Paintings of *Raja mobular* from Villefranche, 1807.
27. *C. kuhlii*. Java.
28. *Cephaloptera*. The specific name is unpublished, from Valenciennes, MS. No locality. A *Manta* of a green colour.
29. Ikan galemma. A *Manta*, evidently from Malaya, from the name.
30. *Cephaloptera*, with an unpublished specific name. Red Sea (Ehrenberg) = *Manta ehrenbergii*.

In addition to the Devil Ray material, the library at the Jardin des Plantes has all the originals of Cuvier & Valenciennes' plates and many apparently unpublished ones, also those of the *Astrolabe* and *Venus* voyages. There is much MSS by LeSueur—neat, detailed, and with exquisite drawings—but mostly American; the Australian MSS and drawings of Péron and LeSueur are apparently at Le Havre, but unfortunately I had insufficient time to ascertain. The Paris library has a considerable amount of Verreaux MSS from Australia and Tasmania.

Amongst Quoy's original drawings (many still unpublished) for the *Astrolabe* plates, I noticed the following elasmobranchs:—

- pl. liv. Squale pris au Port Jervis. [A Grey Nurse, *Carcharias arenarius*].
- lv. Raie de Western. Pour M. Cuvier. [*Myliobatis australis*?].
- ccxxi., 1. Raie à lunettes. Nouv. Hollande. [*Urolophus cruciatus*].
- „ 2. Rhinobate parqué. [*Trygonorrhina fasciata*].
- ccclxx., 1. Roussette de Diemen. [*Cephaloscyllium laticeps*].
- ccxviii. Brain of *Squalus glaucus*. New Zealand.
- ccxix., 1. Brain of *Squalus glaucus*. New Zealand.
- „ 2. Squale Philip. N. Holl.
- ccxv., figs. 1-5. Appareil auditif. Sq. carcharias. Nlle. Hollande. Quoy.
- ccxix. (bis) [A young seven-gilled shark] Ile van Diemen.

ccxx. [Two sharks]. Nouvelle Zélande.

ccclxix. [*Squalus* spp., white-spotted, and a plain male]. Ile Van D.

We see from the plate numbers that the results of the *Astrolabe* voyage, had they been published, would have been voluminous. Amongst Quoy and Gaimard's MSS on sharks were several drawings bearing new names which do not appear to have been published to this day. As the species have been named by others, it would only cause confusion to print the manuscript names here, so I merely mention a new *Scyllium* from Port Dorey, New Guinea, and another from Van Diemen's Land, a "*Squalus glaucus* auctorum" from "détroit de Cook", New Zealand, the seven-gilled shark from Tasmania, and some new species of *Spinax* from New Zealand and Tasmania. Had these new species been published a century ago, our knowledge of our sharks and rays would have been more advanced than it is now. Quoy & Gaimard's MSS also contain original descriptions of Basking Sharks. A drawing labelled *Scyllium pantherinum* A. Val. Leyden, 1827, shows a Javanese *Stegostoma* collected by Kuhl and Van Hasselt and named by Müller & Henle in 1838. There is one teratological example: Drawing No. 147 is of a double-headed shark, apparently a *Mustelus*, labelled "*Squalus glaucus*, pris dans le tage et envoyé à M. le Cte de la Cepede par M. Vandelli. I . . . Lisbonne [indistinct here], 1807".

Family CHIMAERIDAE.

Genus PHASMICHTHYS Jordan & Hubbs, 1925.

Phasmichthys Jordan & Hubbs, Mem. Carnegie Mus., x., 2, June 27, 1925, p. 119. Orthotype, *Chimaera mitsukurii* Jordan & Snyder, Proc. U.S. Nat. Mus., xxvii., Jan. 23, 1904, p. 224, fig. 2, ex Dean MS., from Sagami Bay, Japan.

PHASMICHTHYS LEMURES, *sp. nov.*

(Plate xxii., fig. 2.)

Form elongate, compressed, tapering, of the usual Chimaeroid form, with the snout blunt, not produced. The general habit and the ramifications of the lateral line system (which is wavy on sides of body) may be seen from the accompanying figure. Eye, 15 mm. Length of head, 47. Width of head, 25. Depth of body, 44. Dorsal spine, 38. Pectoral fin, 70. Length of fish (excluding caudal filament) 290, plus filament, 190 = total length, 480. Distance of nostrils from end of snout nearly half length of head.

Seven enamel rods on each anterior lamina of upper jaw, the median ones longest. A single large rod on each side of median line of lower jaw, the fused margin of the lower dental plate being strongly excavate.

Dorsal spine serrated on each side of the shallow groove posteriorly. The first dorsal fin is longer than the spine and connected to the second by a rayless membrane. Margin of second dorsal fin straight, not notched or excavated. Upper lobe of caudal fin less extensive than lower. No anal fin. Pectorals reaching beyond ventral base. Ventrals shorter than dorsal spine. Tail continued as a long thick "filament".

Colour (in formalin) greyish-pink, perhaps originally silvery. Fins brownish, the subcaudal fin being dark brown as is also a marginal band along second dorsal. No ocelli on body but a brown stripe runs along the back and a short, indistinct brownish stripe occurs on the sides of the body. Nose yellowish. Eyes and operculum bluish. A long cream caudal filament.

Described and figured from the holotype of the species, the larger of two female specimens, 18 to 19 inches long. Austr. Mus., Regd. No. E. 3591 (holotype), E. 3590 (paratype). There is a crustacean parasite on the caudal filament of the holotype.

Locality.—Western Australia: Great Australian Bight, S.W. from Eucla at $126^{\circ}45\frac{1}{2}$ min., E. long. at 190 to 320 fathoms depth (F.I.V. "Endeavour", 4th April, 1913).

EXPLANATION OF PLATES AND FIGURES.

(Plate xx., fig. 1.)

Raja cerva Whitley. Holotype from Bass Strait. (Austr. Mus., Regd. No. E. 4970.) Mary Soady *del.*

(Plate xx., fig. 2.)

Urolophus (*Trygonoptera*) *mucosus* Whitley. Holotype from Albany, Western Australia. (Austr. Mus., Regd. No. IA. 670.) Joyce Allan & G. P. Whitley *del.*

(Plate xxi.)

Zearaja nasuta (Müller & Henle). A young specimen from the Portobello Marine Hatchery, New Zealand. (Austr. Mus., Regd. No. IA. 7087.) Joyce Allan *del.*

(Plate xxii., fig. 1.)

Pavoraja polyommata (Ogilby). Lectotype from off North Reef, Queensland. (Austr. Mus., Regd. No. I. 10904.) Joyce Allan *del.*

(Plate xxii., fig. 2.)

Phasmichthys lemures Whitley. Holotype from the Great Australian Bight (Austr. Mus., Regd. No. E. 3591). Mary Soady *del.*

A NEW NOMENCLATOR ZOOLOGICUS.

Nomenclator Zoologicus (Zoological Society of London), 4 Vols., 1939. Edited by S. A. Neave. Price, 8 guineas, post free.

A specimen copy of this valuable work of reference has been submitted for review, but the complete work is expected from London at any time now. Zoologists have long felt the need for a handy *Nomenclator* or *Index* to the vast number of generic names of animals which have been applied from the time of Linné (1758) to the present day. The *Nomenclator Animalium*, being published by the Prussian Academy of Science, is a large work, incomplete, hitherto expensive and now unobtainable, so that we can welcome Dr. S. A. Neave's excellent new English production, the *Nomenclator Zoologicus*, which appears to be remarkably complete, of handy size, and reasonable price, the latter having been made possible by generous donations from Societies, the Carnegie Corporation, and private donors. Not only are all the generic names listed alphabetically, but, in the case of homonyms, of which there are some 18,000, cross-references indicate any new names which have been proposed for preoccupied ones. For this service alone, sighs of gratitude should arise from Museums and Universities all over the world to the Zoological Society of London for this indispensable *multum in parvo*. The whole work contains more than 225,000 entries, believed to represent about 192,000 distinct genera and subgenera in the Animal Kingdom; of these, the names of insects outnumber those of all other animals.

—G. P. WHITLEY.

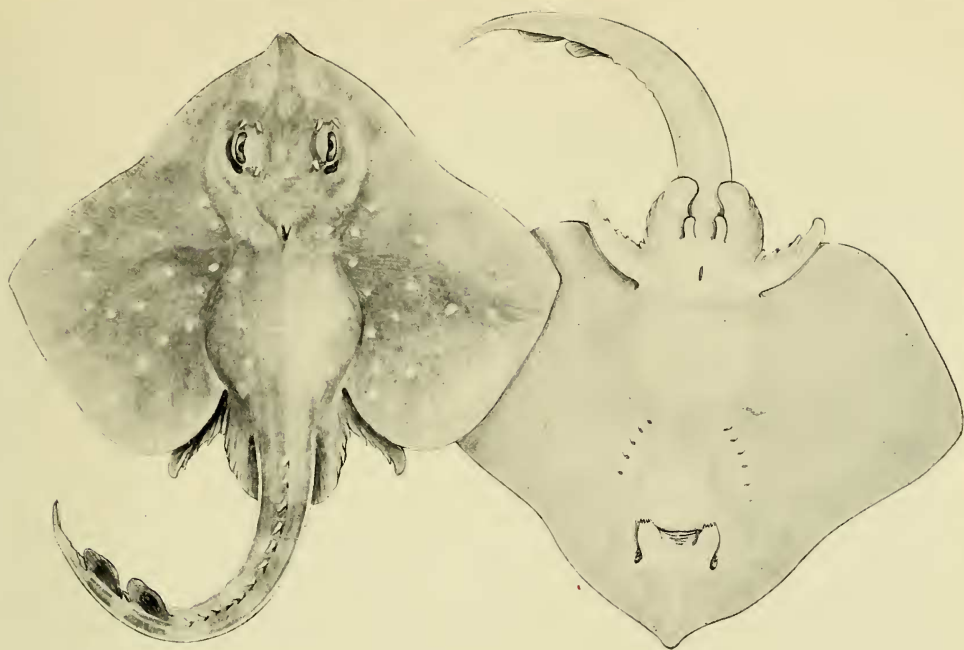


Fig. 1. *Raja cerva* Whitley. Holotype from Bass Strait. (Austr. Mus., Regd. No. E.4970.) Mary Soady del.

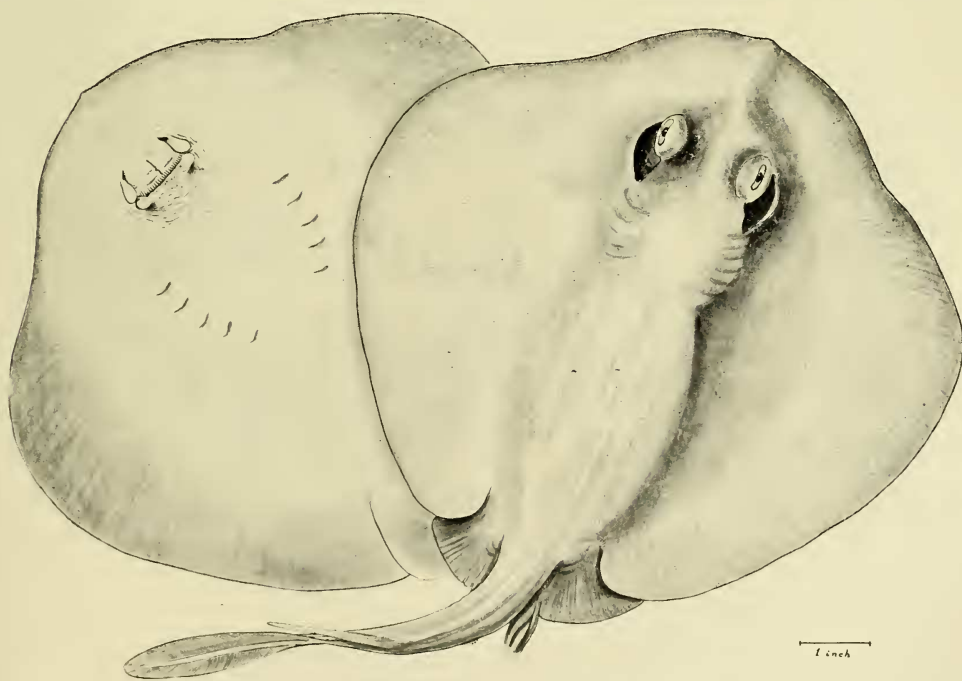


Fig. 2. *Urolophus (Trygonoptera) mucosus* Whitley. Holotype from Albany, Western Australia. (Austr. Mus., Regd. No. IA.670.) Joyce Allan & G. P. Whitley del.



Zearaja nasuta (Müller & Henle). A young specimen from the Portobello Marine Hatchery, New Zealand. (Austr. Mus., Regd. No. IA.7087.) . . .
 Joyce Allan del.

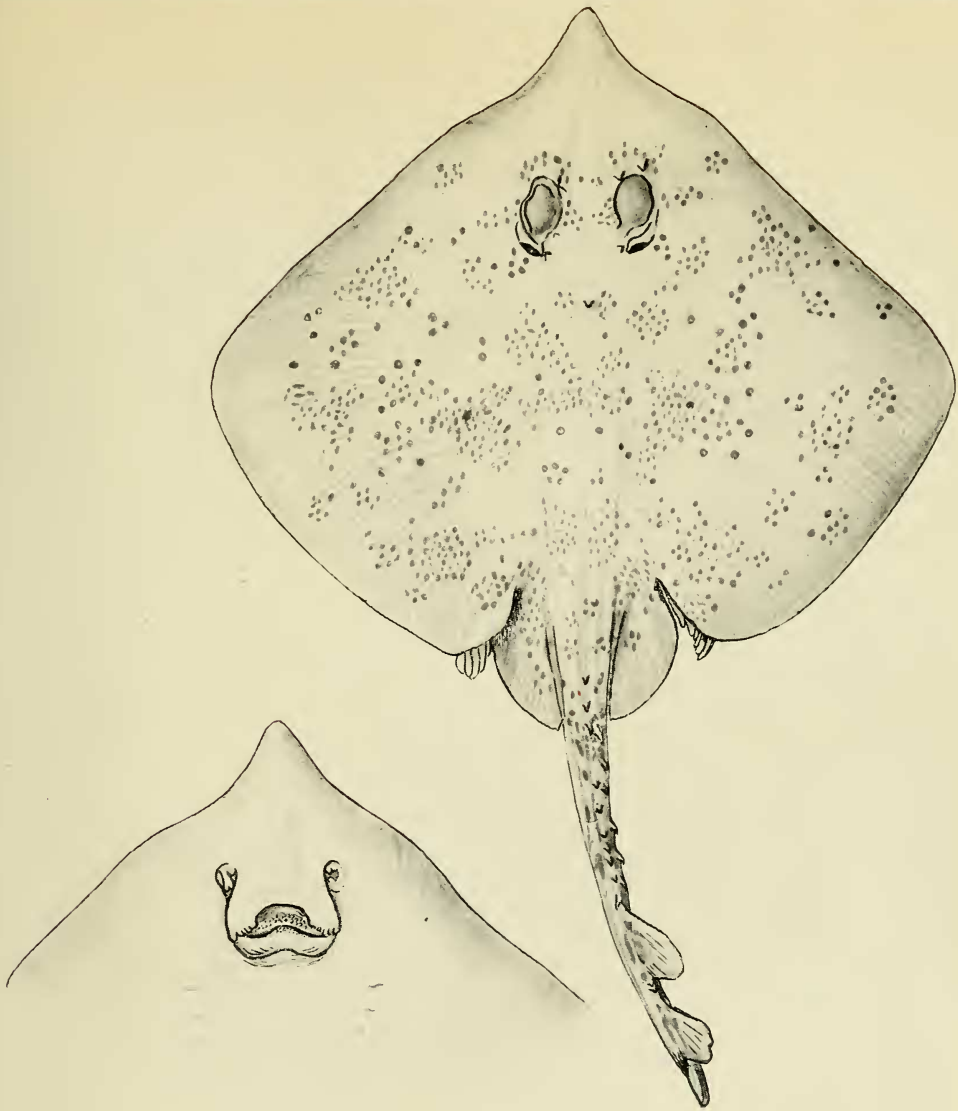


Fig. 1. *Pavoraja polyommata* (Ogilby). Lectotype from off North Reef, Queensland. (Austr. Mus., Regd. No.I.10904.) Joyce Allan del.

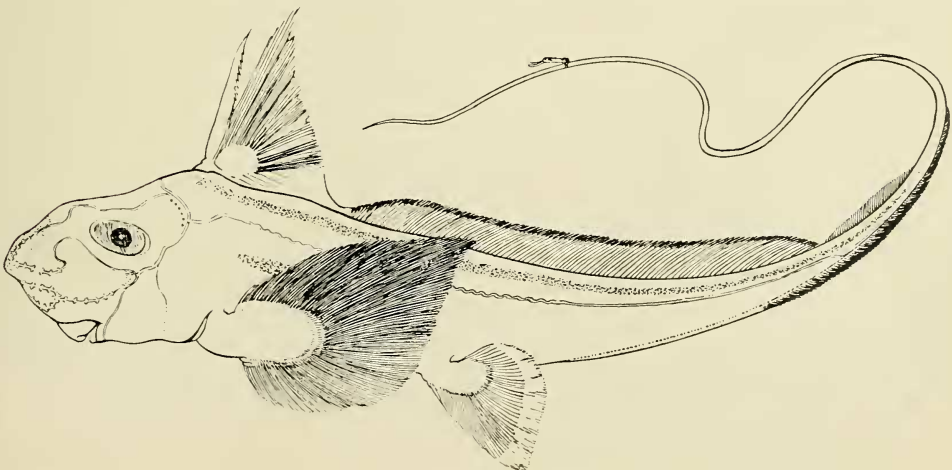


Fig. 2. *Phasmichthys lemures* Whitley. Holotype from the Great Australian Bight (Austr. Mus., Regd. No. E.3591.) Mary Soady del.